NYSCC @ Alfred University's

Raw Materials cookbook 2006

…(because) "the South-beach diet is so 2005".
-2006 Raw Materials class-

Individual Projects...

Name: Jon Ru
Type: Throwing/Building body
Color: Various
Texture: Smooth
Cone: 04

Recipe:

A	
grolleg	25
tile 6	20
C&C	15
frit 3110	40
	100

Hi Soda

B	
grolleg	25
tile 6	20
C&C	15
frit 3124	40
	100

Hi Calcium
Hi Boron

C	
grolleg	25
tile 6	20
C&C	15
frit 3195	40
	100

Hi Calcium
Hi Boron
Hi Alumina

D	
grolleg	25
tile 6	20
C&C	15
talc	40
	100

Hi Magnesium

Add: Commercial Stains:

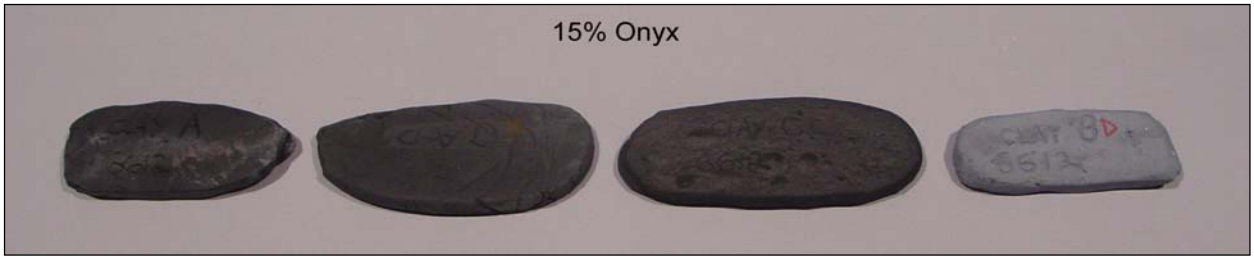
Mason Best Black #6600
Mason Onyx #6612
Mason Chrome Free #6616
Mason Cobalt Free #6666

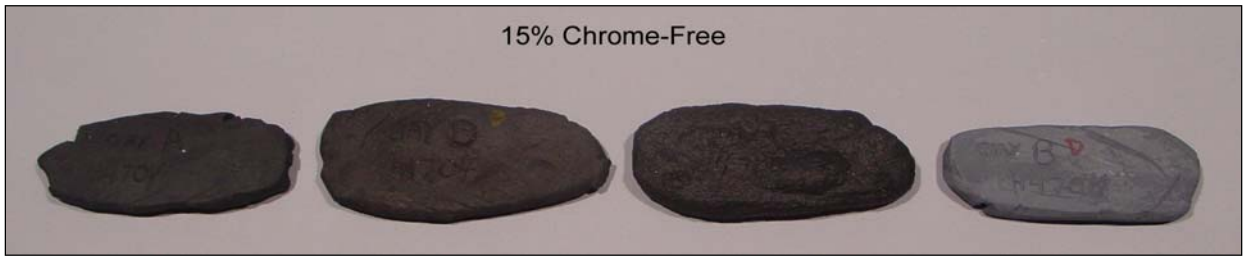
Development Process: The purpose of this project was to create a black body. I tried different black commercial stains in combination with different fluxes.

I started with each body and 15% of each stain, looking for the strongest color response. I found that body "A" provided the strongest color response. Chrome free black stain provided the truest black.

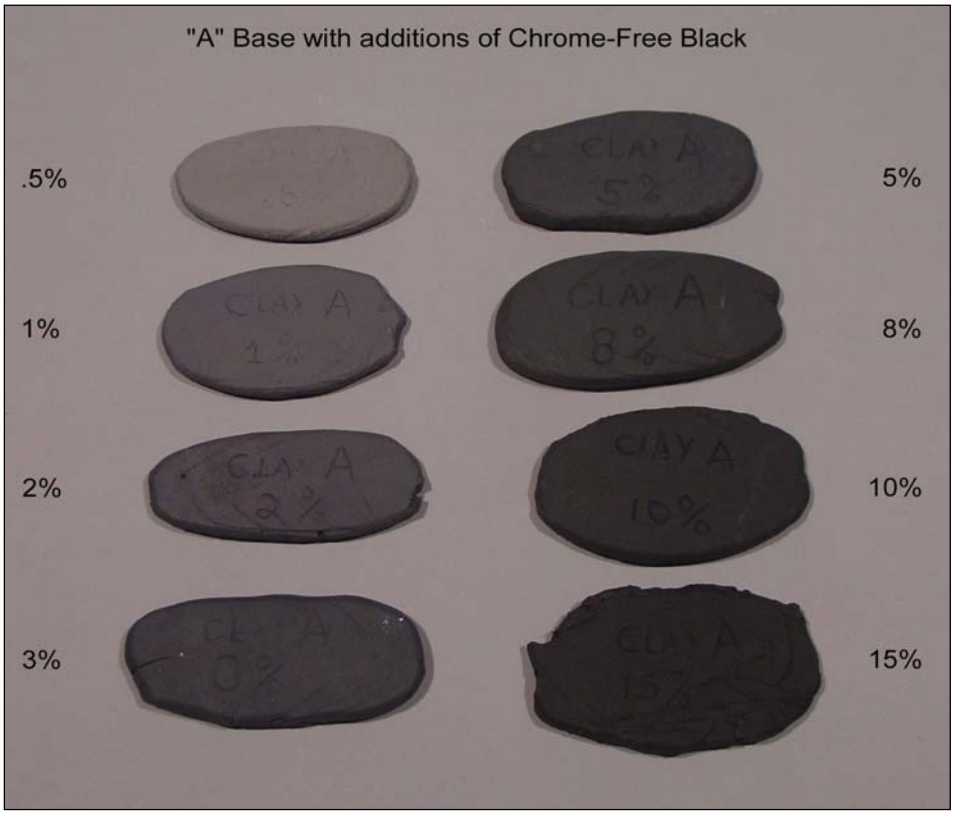
In the second step of the project I created a gray scale by adding increasing amounts of Chrome-Free Black stain. Color response was not proportionate to the amount of stain used.The difference between .5 and 1% was much larger than the difference between 5 and 15%.

"A" Base "B" Base "C" Base "D" Base

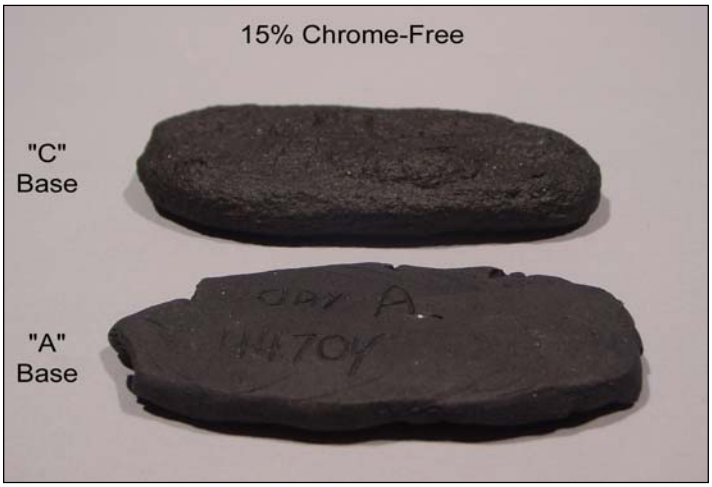




"A" Base with additions of Chrome Free Black



The samples below show the difference a frit can make in a body. Both use the same amount of the same stain. "A" base is high in soda. "C" base (severely bloated) is high in calcium and boron.



Cross-section of bloated sample ("C" Base with 15% Chrome-Free).
Despite being very porous, the sample is quite hard.

Name: Graham Erisman
Type: Throwing/Building body
Color: Various
Texture: Smooth
Cone: 04

Recipe:

A	
grolleg	25
tile 6	20
C&C	15
frit 3110	40
	100

Hi Soda

B	
grolleg	25
tile 6	20
C&C	15
frit 3124	40
	100

Hi Calcium
Hi Boron

C	
grolleg	25
tile 6	20
C&C	15
frit 3195	40
	100

Hi Calcium
Hi Boron
Hi Alumina

D	
grolleg	25
tile 6	20
C&C	15
talc	40
	100

Hi Magnesium

Add: Commercial Stains:

Mason Tangerine #6027
Mason Dark Red #6021
Mason Lobster #6026
Mason Shrimp Pink #6022
Mason Silver Grey # 6530

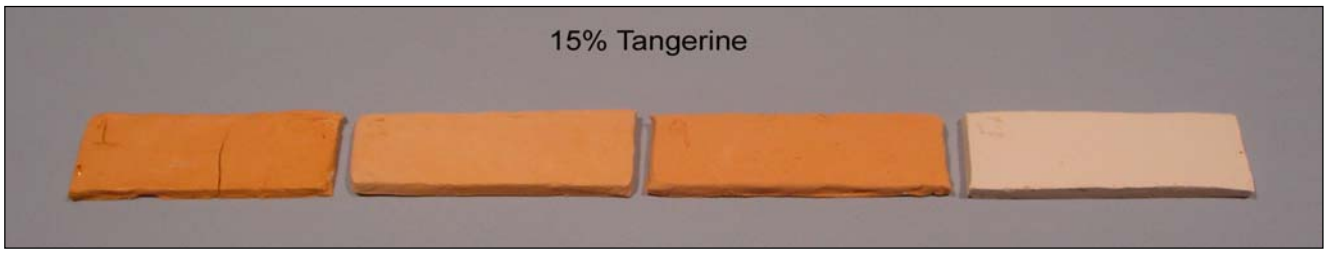
Development Process: The purpose of this project was to see how different fluxes can affect the color response of commercial stains in clay bodies.

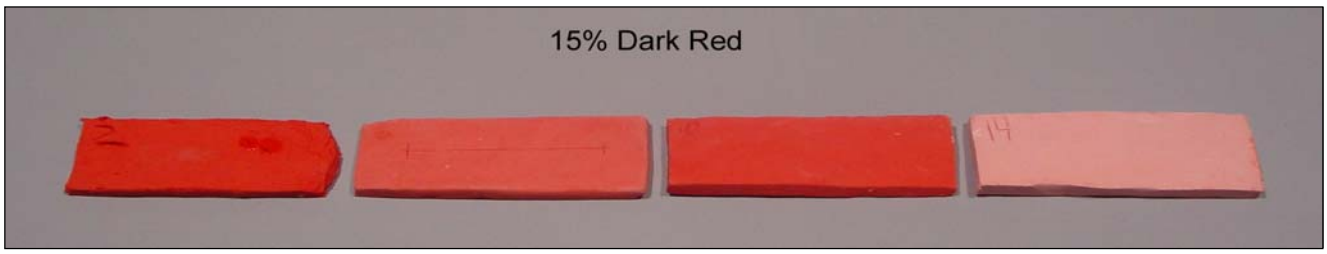
I started with each body and 15% of each stain, looking for the strongest color response. I found that body "D" muted or tinted out the colors because of the talc and found that body "A" provided the best color results.

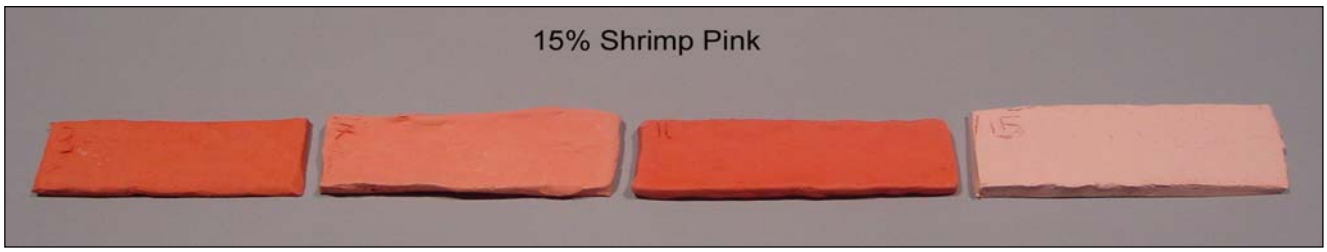
The second step of the project was to create a gradient of color. I added increasing amounts of Tangerine stain to a constant 15% Silver Grey stain addition. I tried to find a point in which orange is visible in a silver color. I found that 15% Silver Grey was too dark or too high of a percetage. For future tests I should reduce the amount of Silver Grey while increasing the Tangerine.

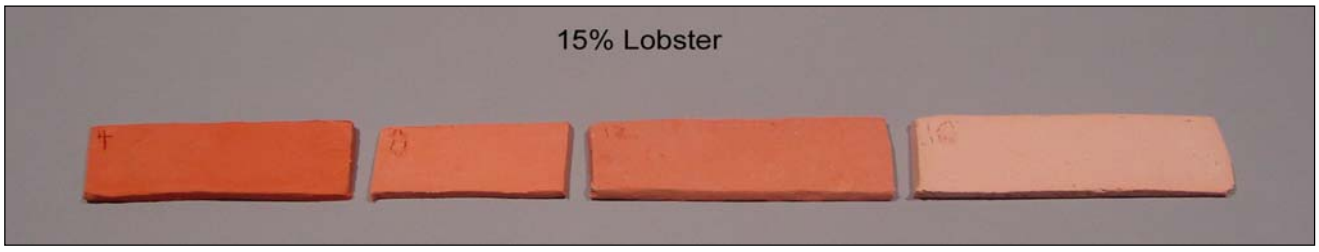
I also found that when the 3110 frit isn't mixed properly an interesting effect occurs. The surface ruptures and glass forms on the surface.

"A" Base "B" Base "C" Base "D" Base



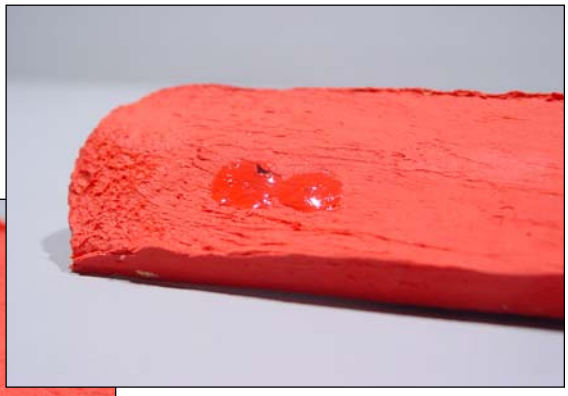






"A" Base with blend of Silver Grey and Tangerine

Defects caused by improper mixing
(unmixed frit in the body)



Name: Michael Hill
Type: Dry Slip
Color: Pale grey with carbon trap, breaking to oragnge where thin
Texture: rough
Cone: 10 reduction
Firing Notes: Early body reduction at roughly C.010
Pecularities: Will crack during firing where very thick

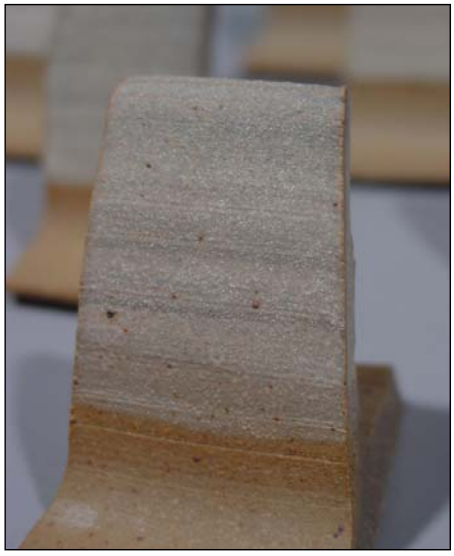
Recipe: Mike's Final Pick (Point #13 from Third Triaxial Set)

Nepheline Syenite	10.1
Custer Feldspar	14.2
Calcined Kaolin (Glowmax)	9.5
Helmer Kaolin	28.4
XX Sagar	4.7
Flint	12.4
Coarse Alumina Hydrate	8
Borax	4.7
Soda Ash	8
	100%

Development Process: My goal was to get a dry surface with shino color. The first triaxial tests used a Val Cushing bisque application slip and added Molochite 200 mesh and fine alumina hydrate. I picked a point that had a good surface and did a second triaxial test.

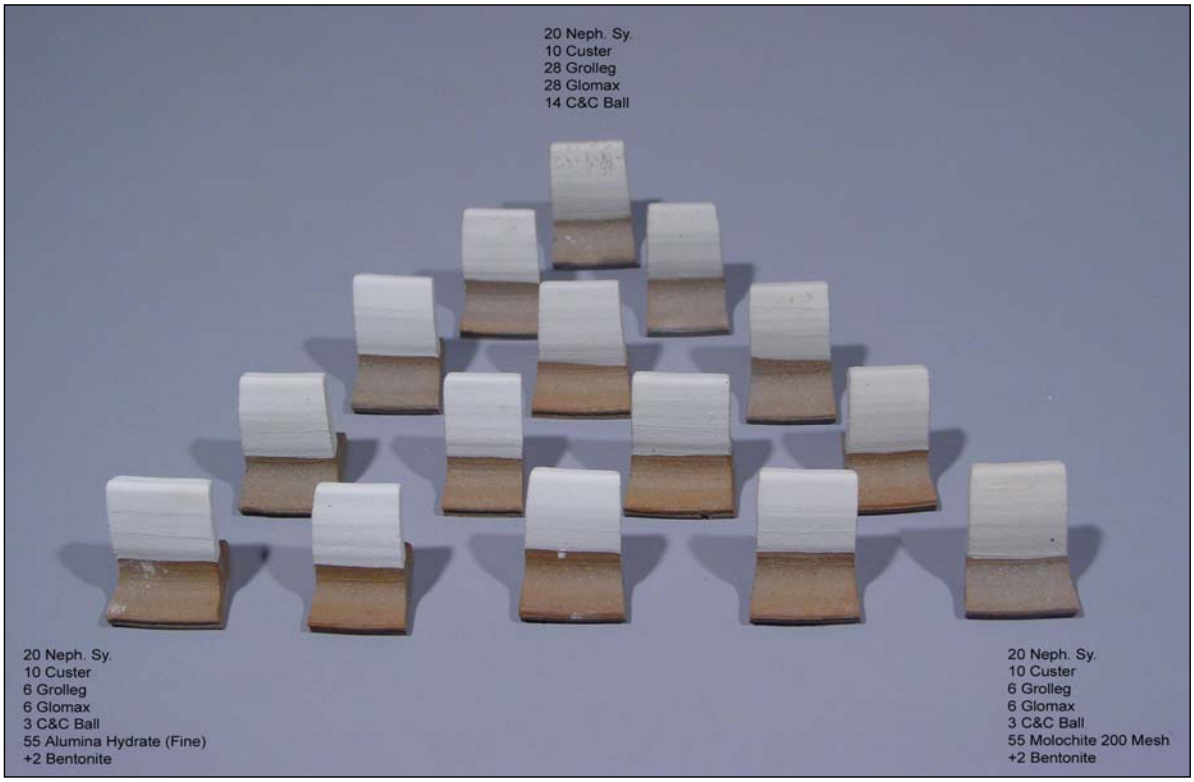
In this second test I added Redart and Soda Ash to try to get shino color, but nothing happened (though where thin at the edges the tests with increasing soda did start to break to a dark orange). This was probably due to an excess of alumina.

Backtracking, I used another slip that is known to flash in salt and soda, and added coarse alumina hydrate and soda ash. The results were good, with a fused, sandpaper-like surface and carbon trapping.

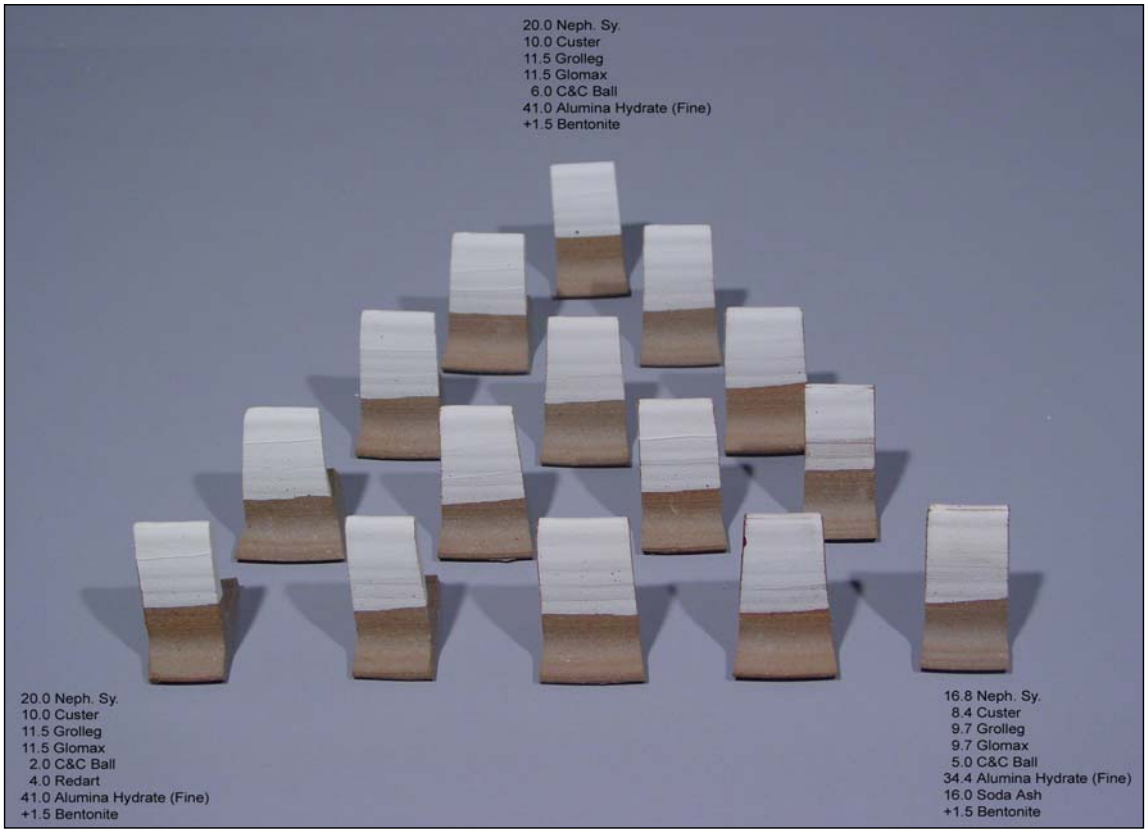


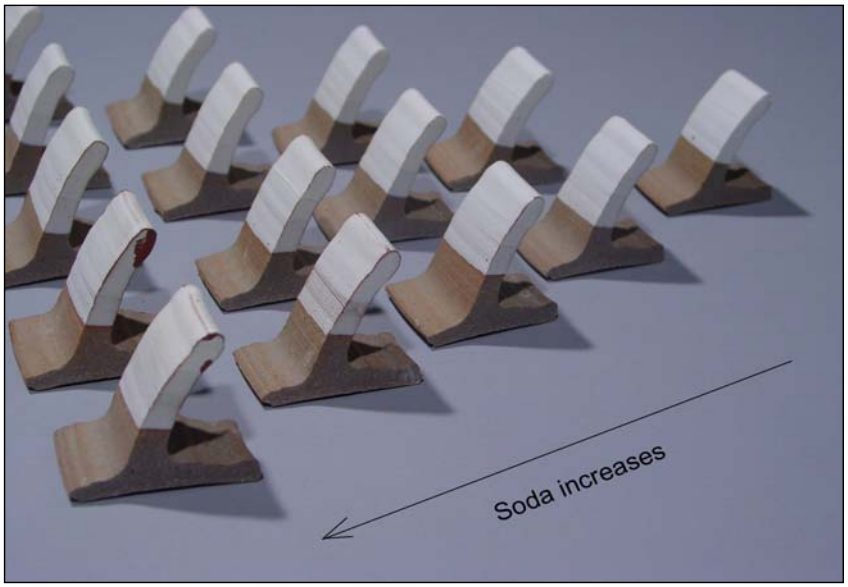
Mike's final pick (Point #13 from Third Triaxial Set)

First Triaxial Set

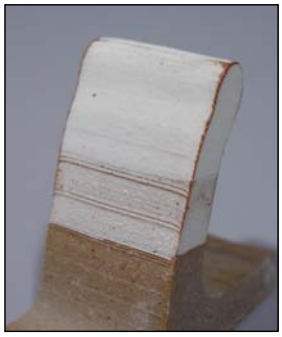


Second Triaxial Set



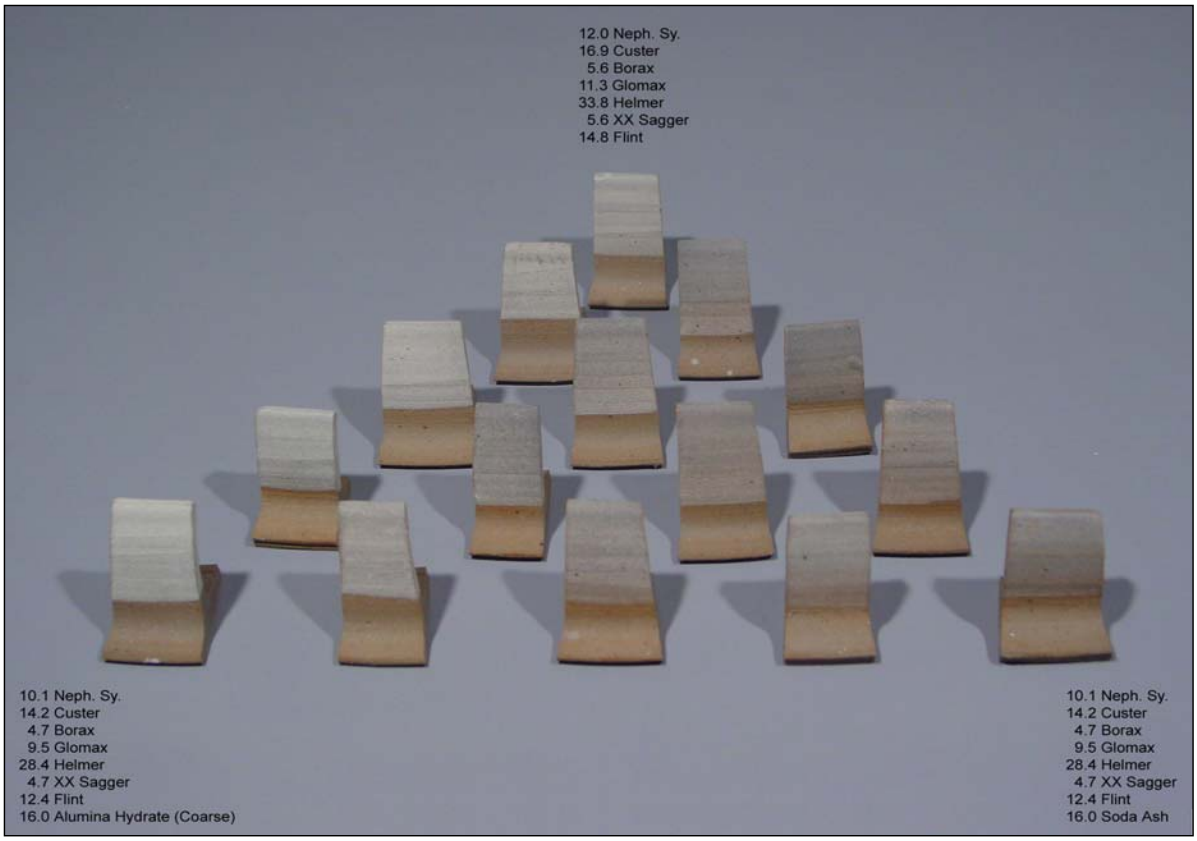


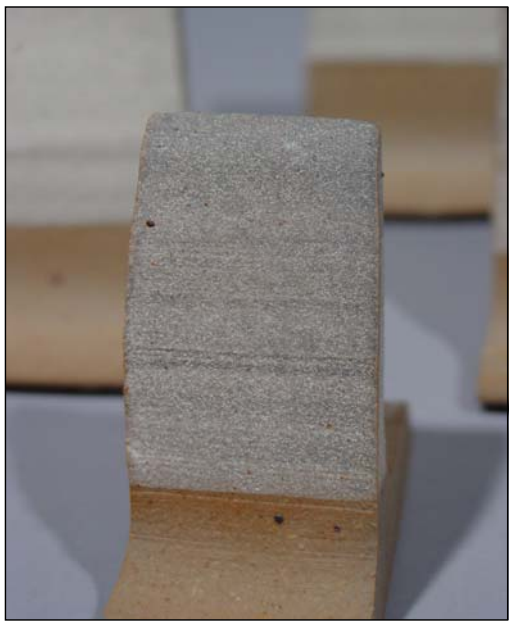
Second Triaxial Set seen from the side. As Soda Ash increases, so does flashing.



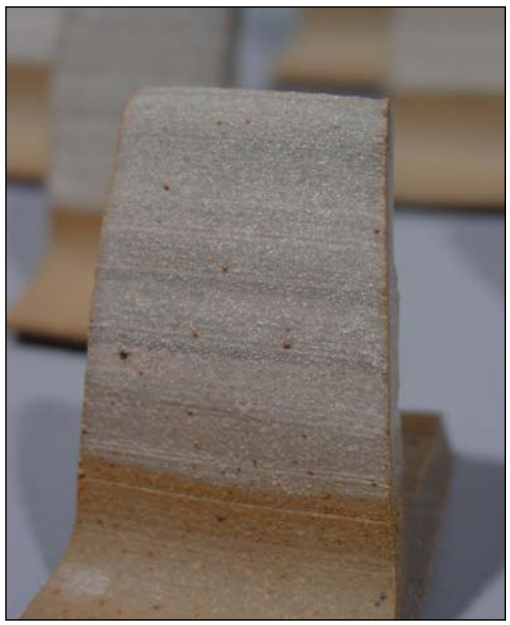
Point 10 from Second Triaxial Set

Third Triaxial Set





A more speckled variation of Mike's pick (Point #8 from Third Triaxial Set)



Mike's final pick (Point #13 from Third Triaxial Set)

Name: Karlyn Fendya
Type: Plaster/Silica Molds for glaze casting
Color: n/a
Texture: n/a
Cone: 10 Reduction

Recipe: Karlyn's Final Choice

Flint	50
Plaster (#1 Pottery)	21.4
Grog	28.6
	100%

Development Process: The purpose of this project was to explore how plaster, silica and grog can be combined to create molds for containing glazes and other fluid materials during firing.

A wooden master-mold was built into which the various plaster-silica ratios where cast.

I began by mixing different ratios of plaster and silica

Plaster	Silica
%	%
60	40
50	50
40	60
30	70
20	80

The 30:70 ratio produced the best results. This ratio allowed the mold to release easily from the wooden master-mold. It held its form during firing without cracking. However, there was considerable warping after firing.

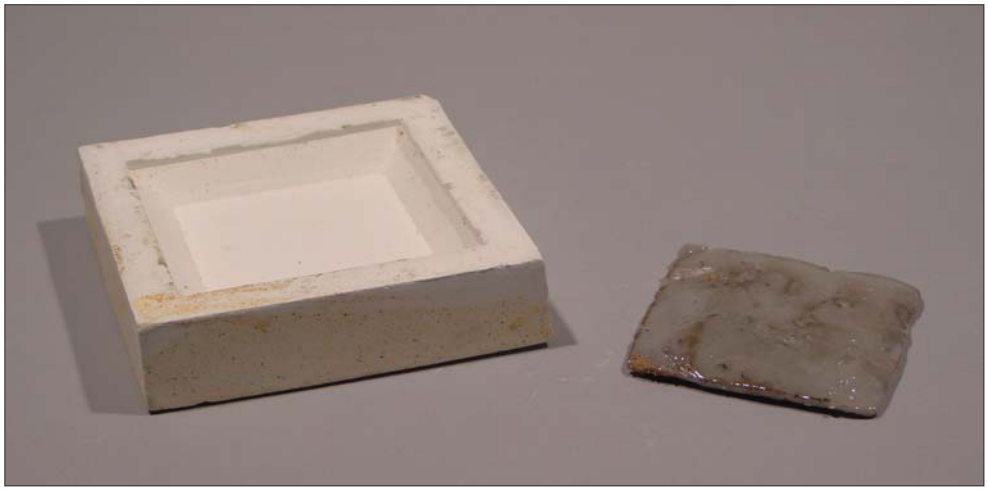
I then did 10% additions of medium grog (20/48 mesh) to the 30:70 mixture.

Grog	Plaster/Silica
%	%
10	90
20	80
30	70
40	60
50	50

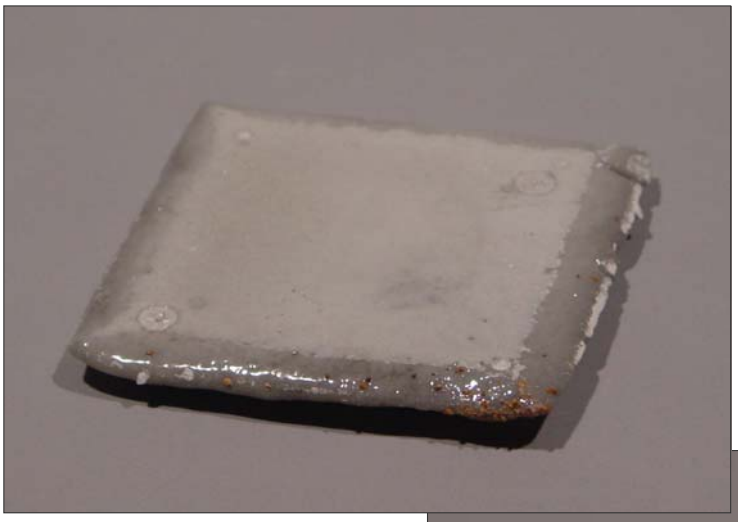
The 40% grog addition seems to show the least amount of shrinking/warping. 50% grog is similar in results but not better enough to justify the extra expense of this material.

I also did a random test using equal parts of medium grog, plaster, and silica. This equal parts mixture held up well, but I am unsure of its ability to release the melted material after firing (to hard?).

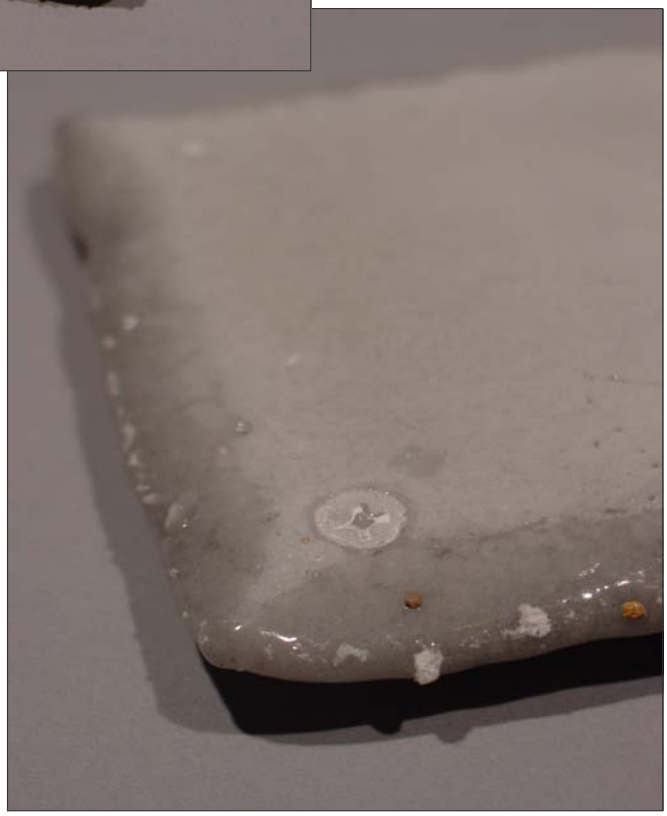
30% Plaster/70% Flint mold after C.10 Reduction firing with Kona F-4 sample imbedded.



Bottom of Kona F-4 sample. Light gray area was in contact with mold during firing.

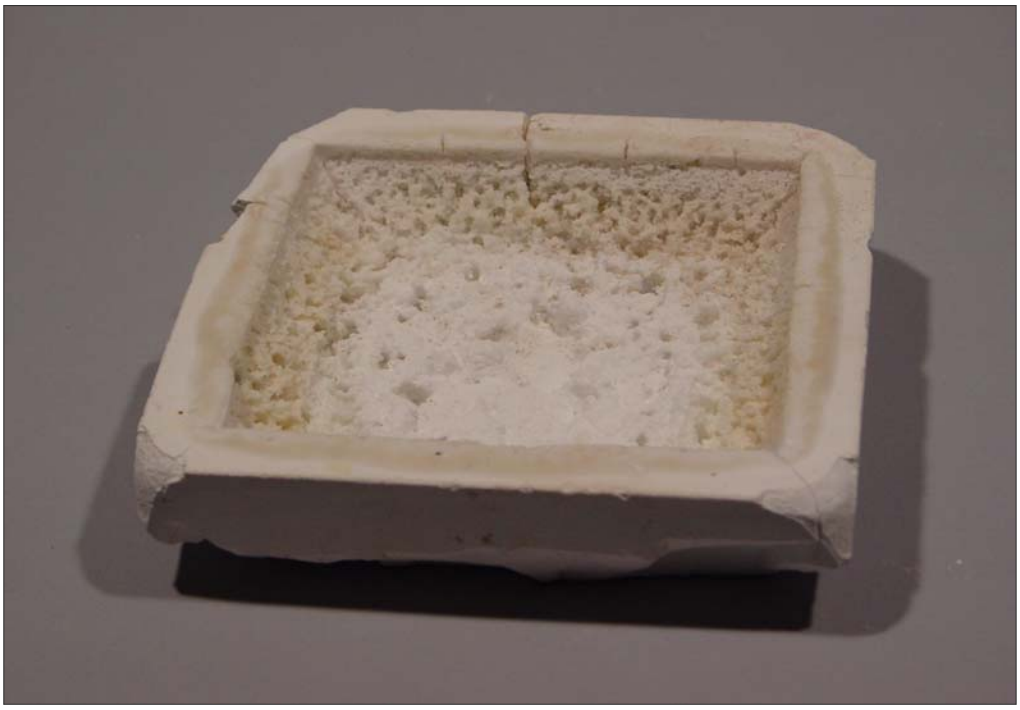


Mold made using 50% addition of grog



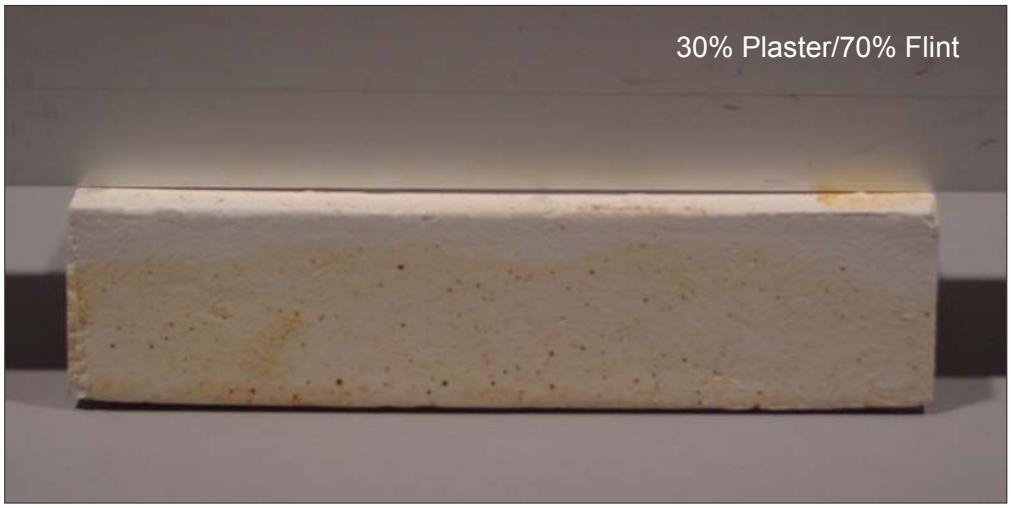
A high level of detail is possible. Note the impression of the wood screw which was part of the original mold.

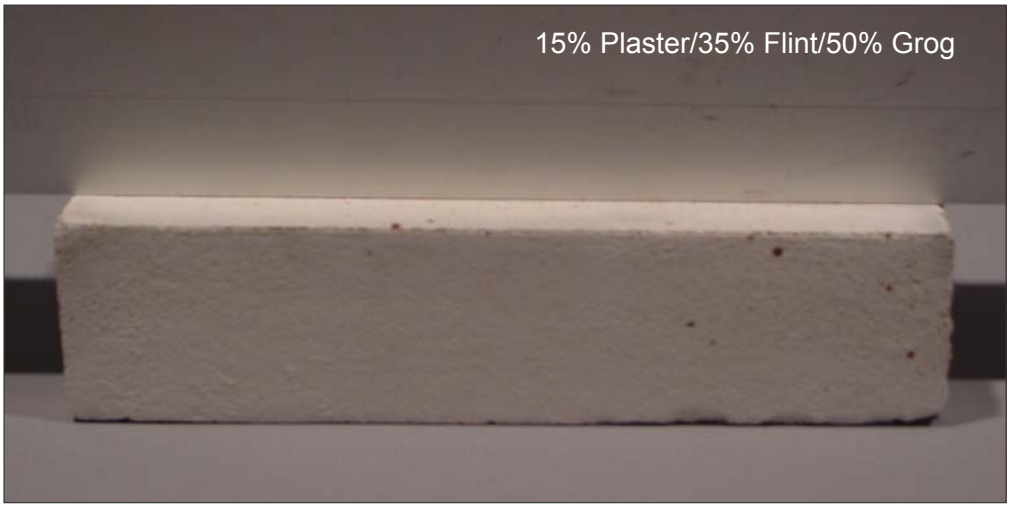
Frit 3124 fired to C.10 Reduction. The sample did not release as the frit impregnated the porous mold.

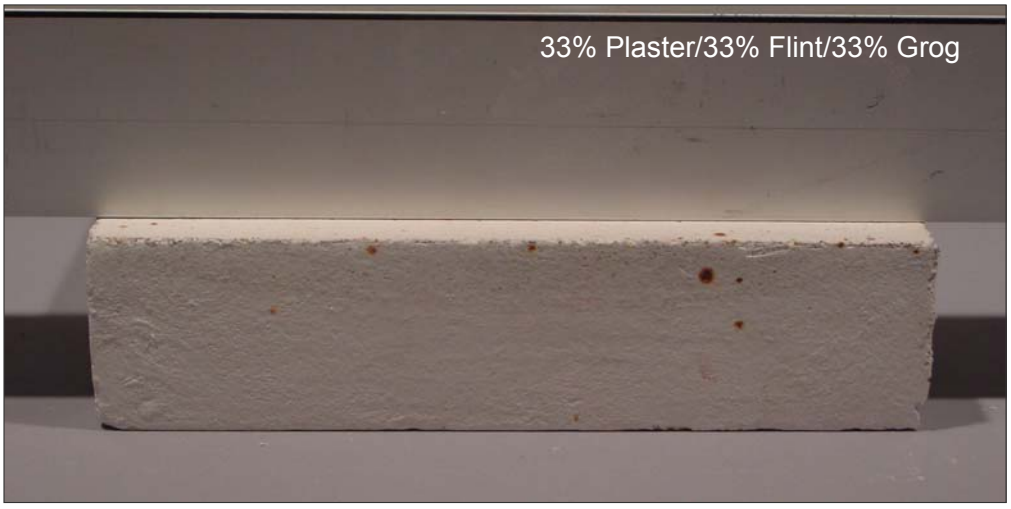


This cross-section shows how the mold densified as the molten frit travelled through it during the firing.

In the following images a flat aluminum extrusion was placed on the top edge of each mold. The gap between the extrusion and the mold illustrates the degree of fired warpage for each mixture.







Name: Kathleen Andersen
Type: Colored Porcelain (throwing or handbuilding)
Color: Various
Texture: Smooth
Cone: 10 oxidation and reduction
Firing Notes: Some colors seemed brighter and more vibrant in reduction (esp. Cobalt)

Recipe:

Grolleg	19
EPK	31.4
C&C Ball	15.7
Kona F-4	24
Flint	18
Molochite 200 mesh	3
	100%

Add: Various amounts of oxides and carbonates

Chrome Oxide	3.25%
Black Iron Oxide	2%
Red Iron Oxide	2%
Cobalt Carbonate	1 and 5%
Yellow Ochre	4%
Copper Carbonate	1 and 5%
Manganese Carbonate	1%
Manganese Dioxide	3%
Nickel Carbonate	5%
Rutile	5%

Development Process: These samples were all dry mixed. The marblized color variation visible in some samples was an aesthetic choice.

When using the clay for handbuilding there may be some slumping but if you allow the clay to dry (so that it stiffens up) before continuing to build, it will hold its shape better.

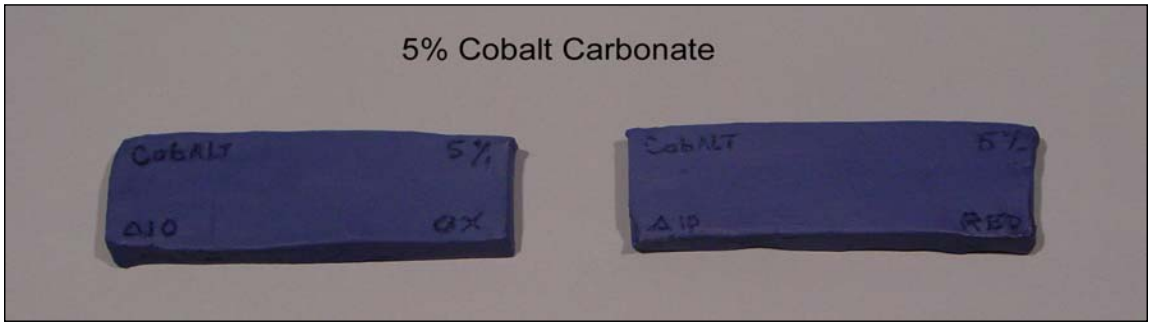
Copper seemed to provide the widest range of results from oxidation to reduction. In reduction copper came out a lavender at 1% and a dark burgundy to black color at 5%

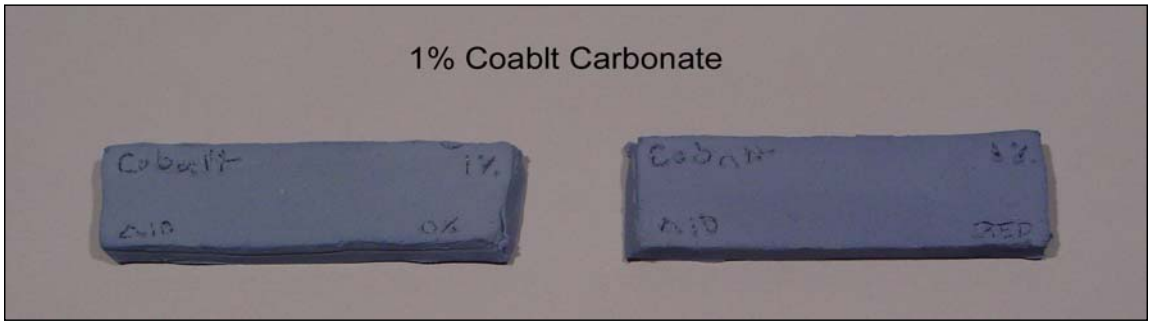
Nickel came out a more yellow green in reduction than in oxidation

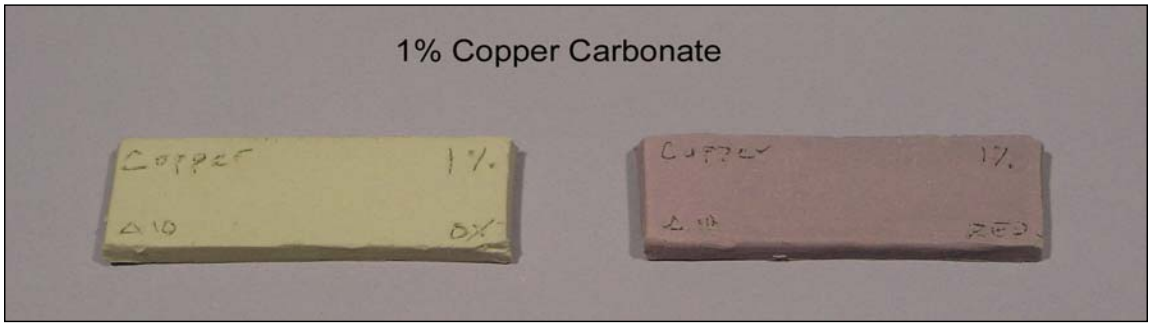
Yellow Ochre came out a grey tan in reduction but a yellow tan in reduction

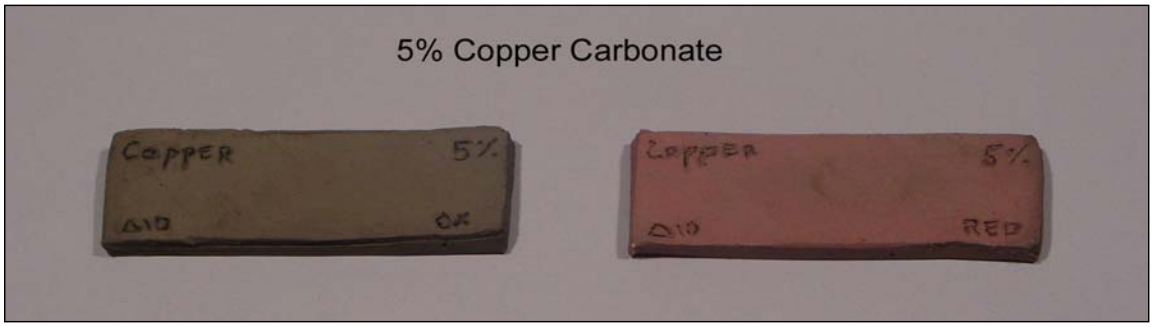
Rutile had a spotting effect which might be because the colorant has a tendancy to clump

Oxidation Reduction

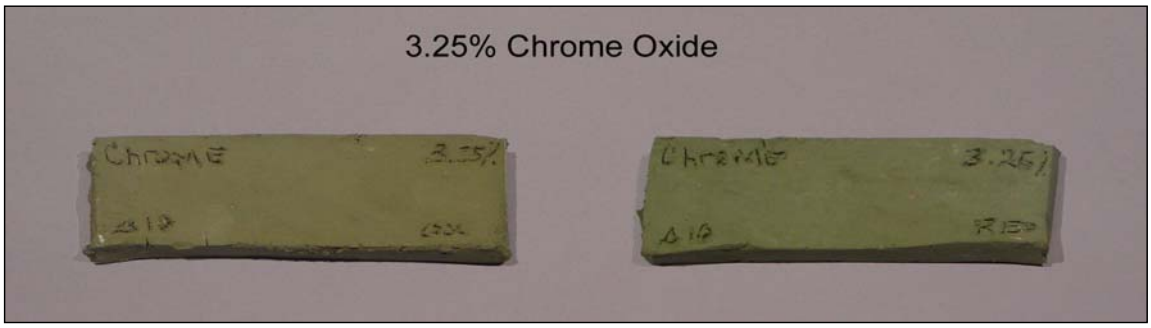


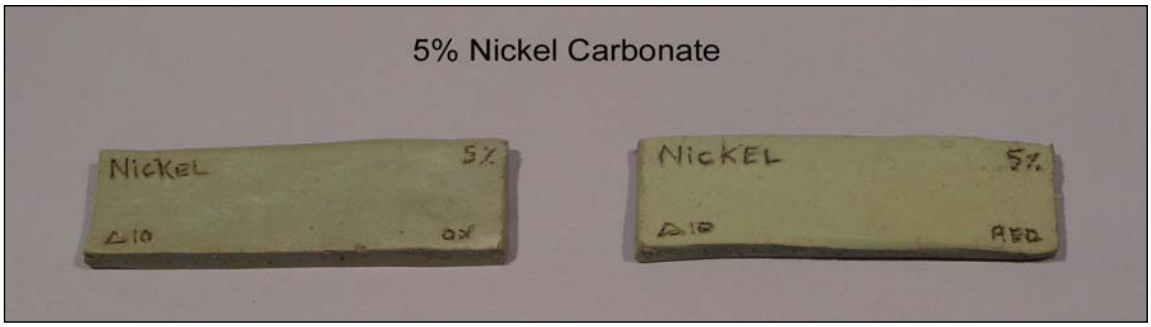


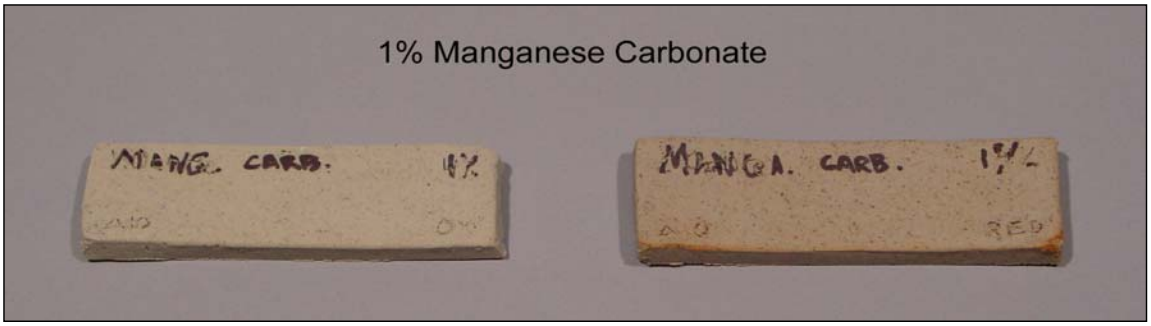


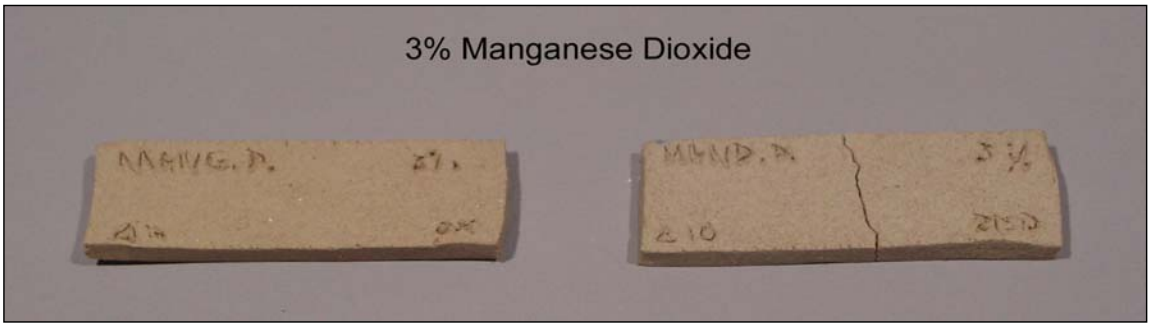


Oxidation Reduction

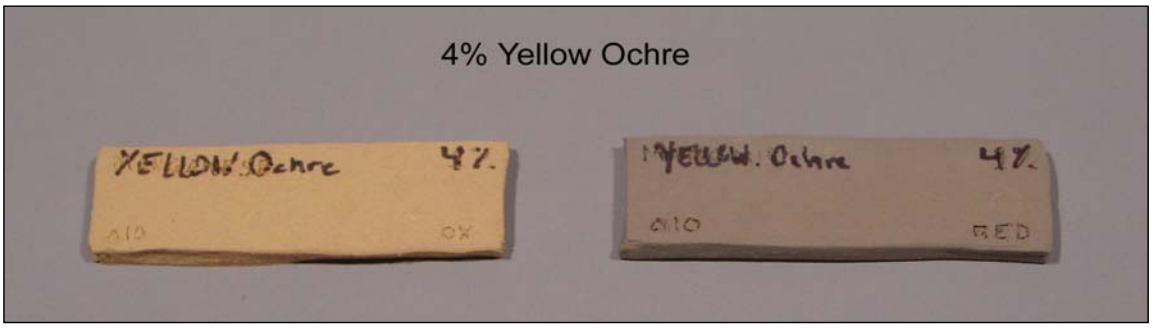


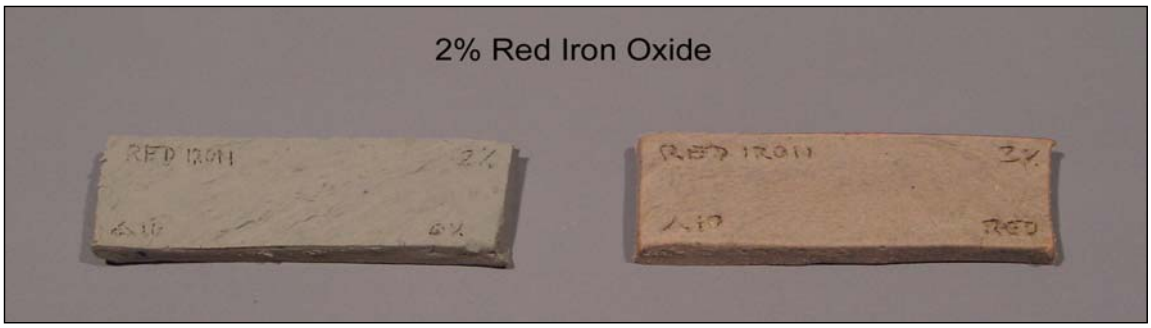


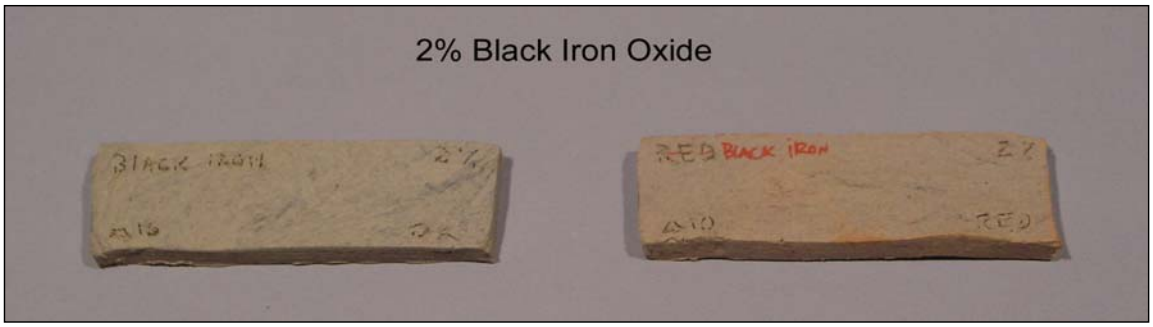


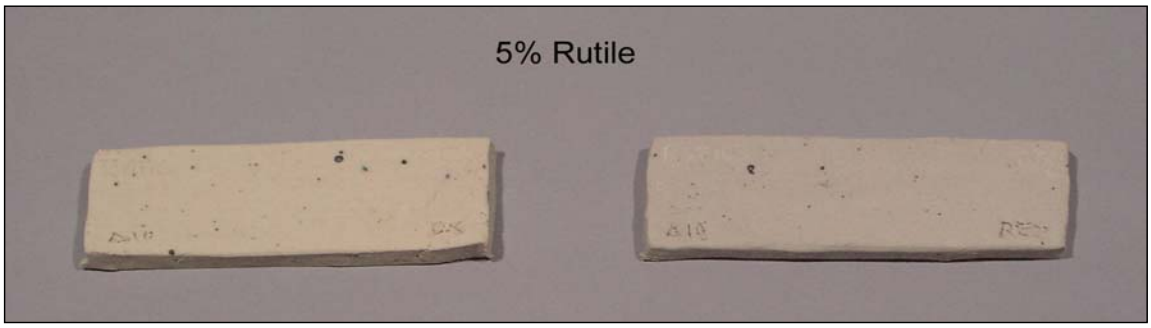


Oxidation Reduction









Name: Molly Jones
Type: Under glaze pencils
Color: Various
Texture: Smooth
Cone: 10

Recipe:		
	Jackson Ball	50
	Kona F-4	25
	Flint	25
		100%

Add:		
	Veegum	3
	Sodium Silicate	1
	Colorant	15

Clear glaze used: Choy Clear (From Cushing's Handbook)

Custer Feldspar	50
Whiting	6
EPK	4
Barium Carbonate	12
Flint	28
	100%

Development Process: My Goal was to make ceramic pencils to be used on bisque ware, glazed over and fired to cone 10.

For each colorant I made a 100 gram batch and extruded 3 pencils. One set of pencils was fired to cone 06, one to 014, and the last set was left raw. I tested the mark making qualities of each set on bisqued tiles. Most of the pencils fired to 06 were too dense to draw with at all. The 014 set produced much better results; however they were still slightly dense as compared to the raw set. The unfired pencils were much softer and left a greater amount of color on the tile.

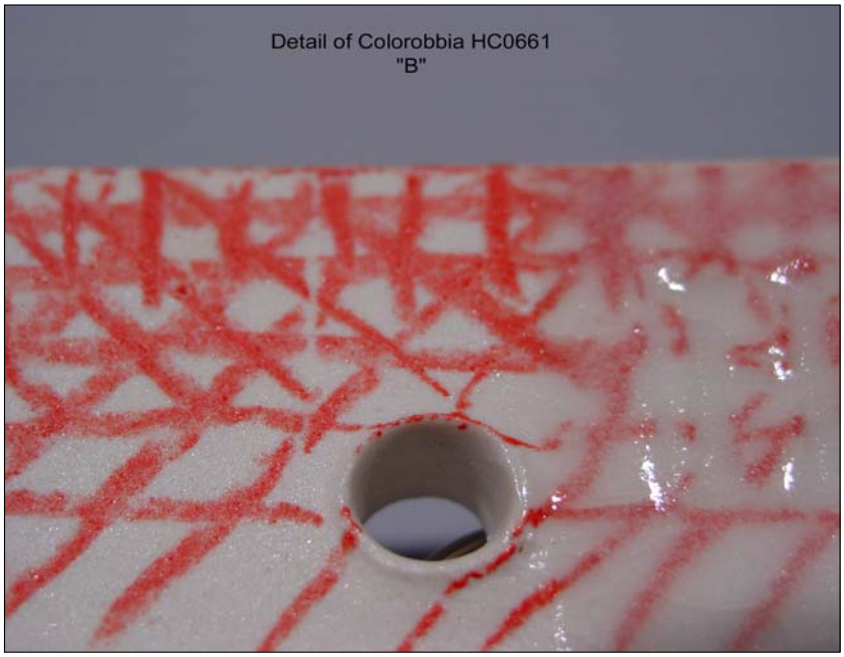
I also tested the use of wax in place of water on one of the samples.This produced a soft pencil that was easy to draw with, even when bisqued at 06, but most of the material that was left behind was loose and could be easily brushed or blown off.

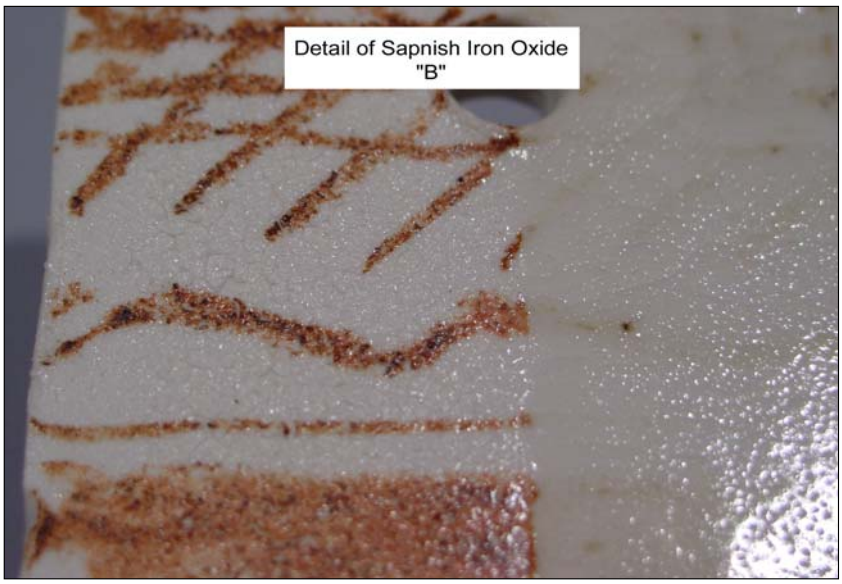
In the first run of colors I tested 10 oxides. They looked quite nice on the tiles before they were fired, but after being fired to cone 10 they turned various shades of brown. In the next two sets of tests, I used commercial stains, which resulted in much more color variation at cone 10. However, the colors tended to be light, perhaps because of the base recipe or the amount of colorant added. At each step in this process there were several options to choose from. I could only test out one or two at each point. There are many possibilities still to be tested.

1 Chrome Oxide
2 Nickel Carbonate
3 Black Iron Oxide
4 Manganese Dioxide
5 Light Rutile
6 Yellow Ochre
7 Crocus Martis (15%)
8 Yellow Iron Oxide
9 Copper Carbonate
10 Spanish Iron Oxide
11 Crocus Martis (7%)
12 Crocus Martis (3%)

Note: "A" denotes pencil on pre-bisqued clay
"B" denotes pencil on a pre-bisqued tile with a white bisque slip underneath pre-fired to C.04. This cracked during final firing and its effects can be seen in some of the images. The tile was coated with a gloss glaze on the right half after drawing and refired. In many cases, the white slip seemed to flux the overlying pencil, creating darker color responses than on the "A" tiles.

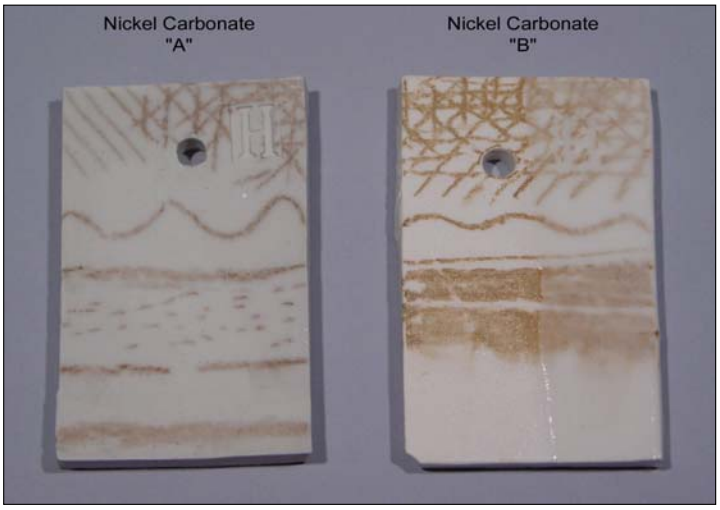
Various pencils

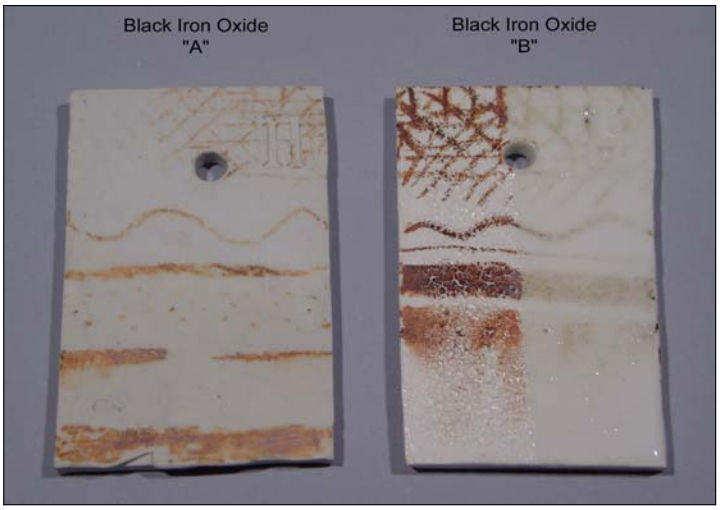


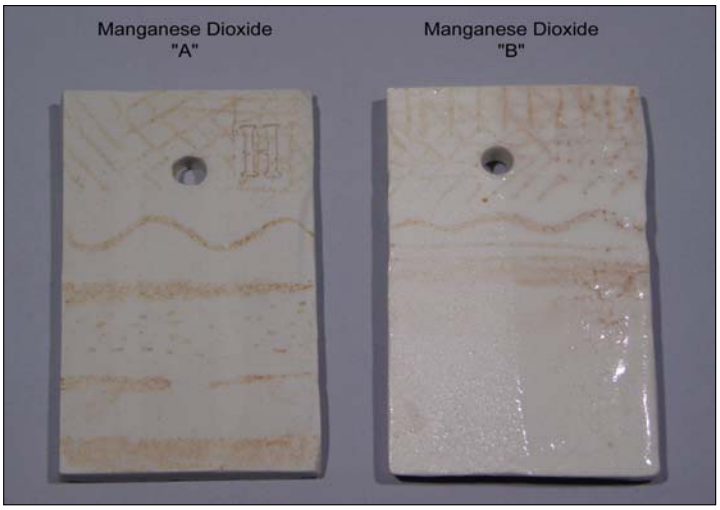


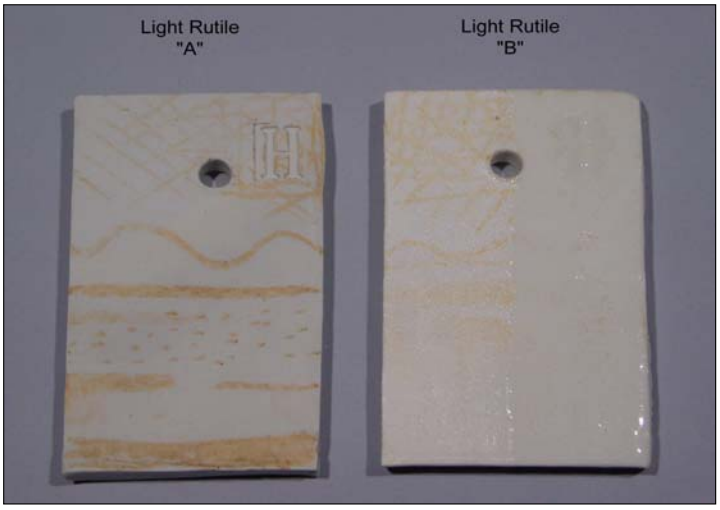
Oxides

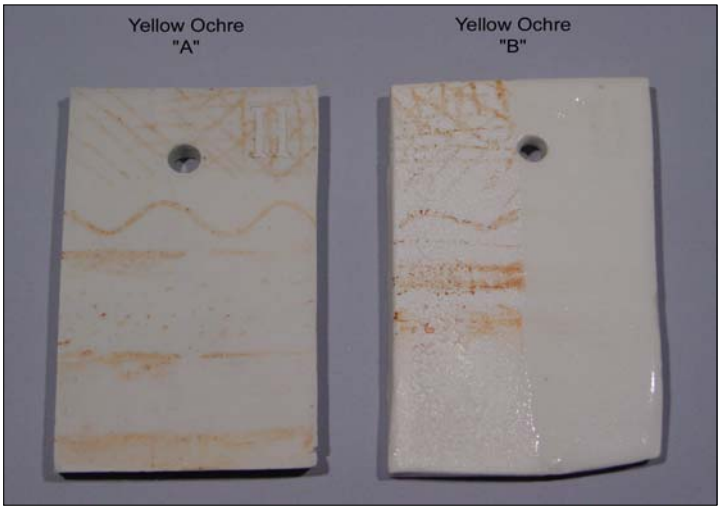

Chrome Oxide
"B"


Nickel Carbonate
"A"
Nickel Carbonate
"B"

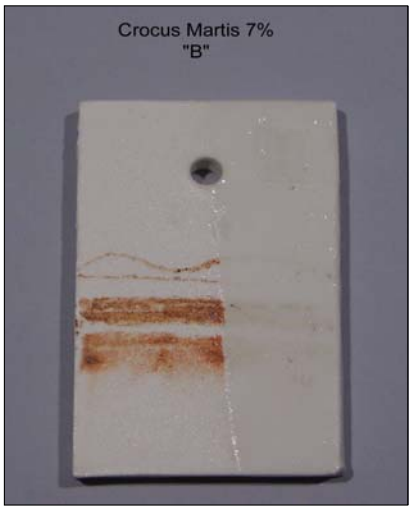

Black Iron Oxide
"A"
Black Iron Oxide
"B"

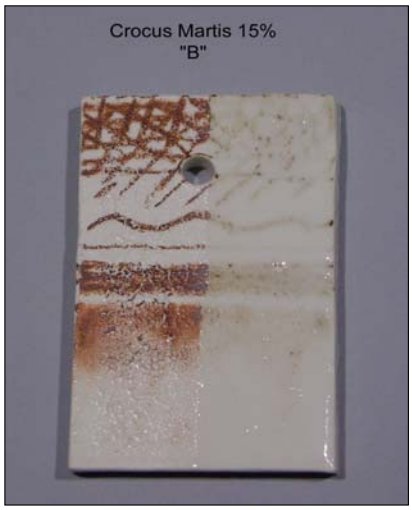

Manganese Dioxide
"A"
Manganese Dioxide
"B"

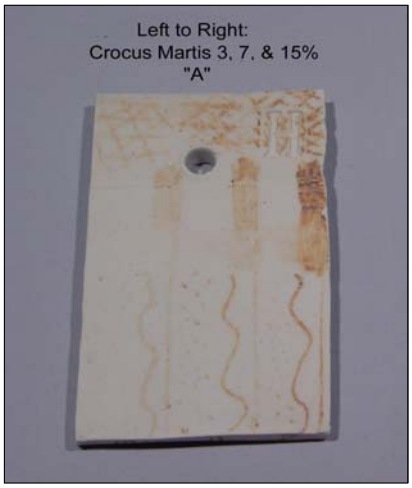

Light Rutile
"A"
Light Rutile
"B"


Yellow Ochre
"A"
Yellow Ochre
"B"

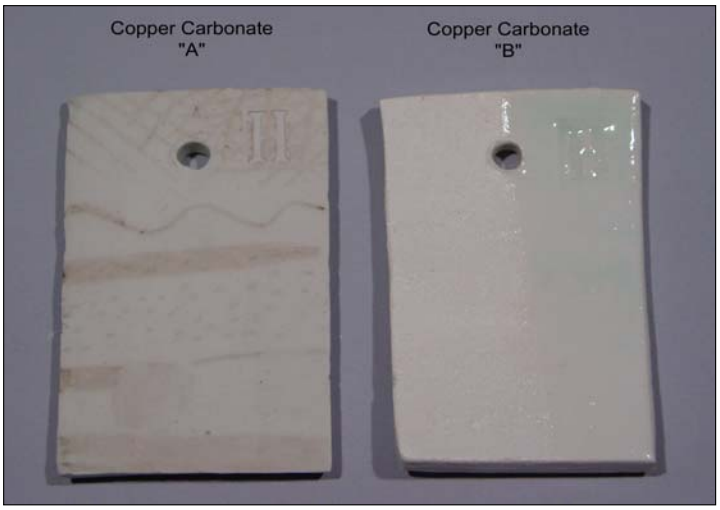

Crocus Martis 3%
"B"

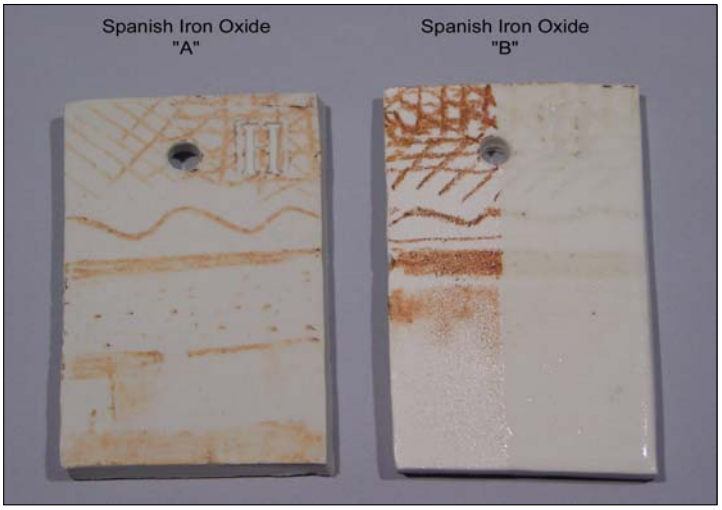

Crocus Martis 7%
"B"


Crocus Martis 15%
"B"


Left to Right:
Crocus Martis 3, 7, & 15%
"A"


Yellow Iron Oxide
"A"





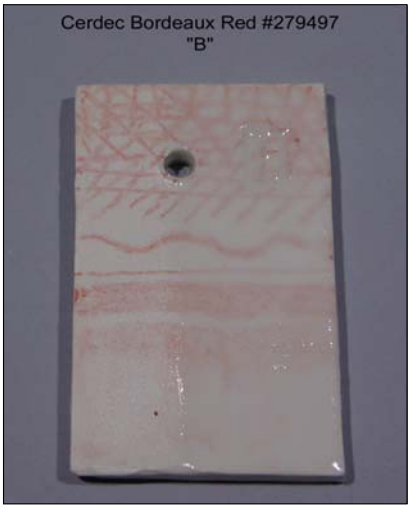
Commercial Stains

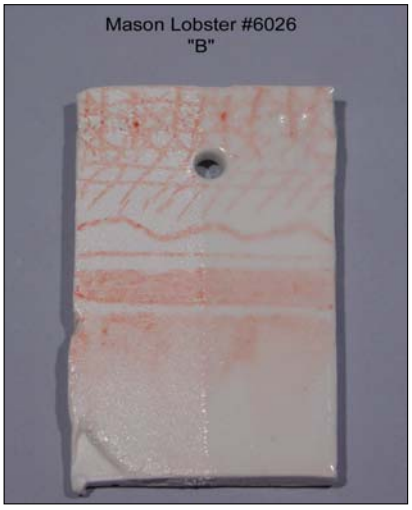
Black slip prefired before applying pencils


Colorobbia HC 0611
"B"

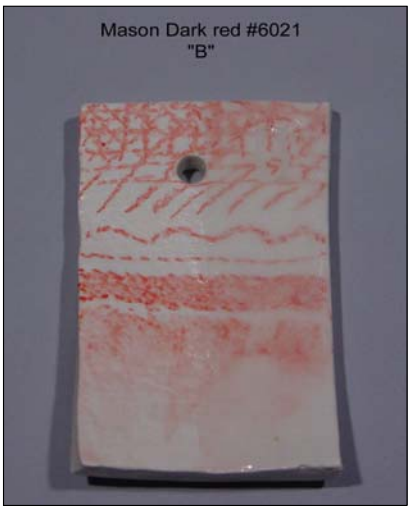

Mason Shrimp Pink #6022
"B"


Top: Pemco Blue/Green GS 117
Bottom: General Color Orange MC 3400
"B"


Cerdec Bordeaux Red #279497
"B"

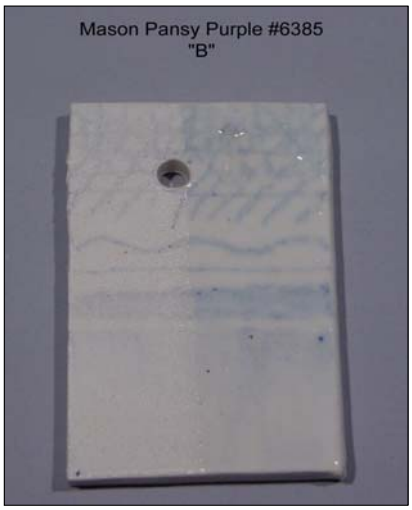

Mason Lobster #6026
"B"


Ferro Turquoise C636A
"B"


Mason Dark red #6021
"B"


Pemco Blue/Green GS 117
"B"

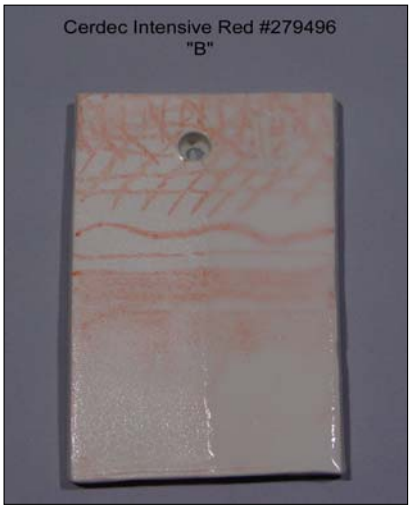

Mason Tangerine #6027
"B"

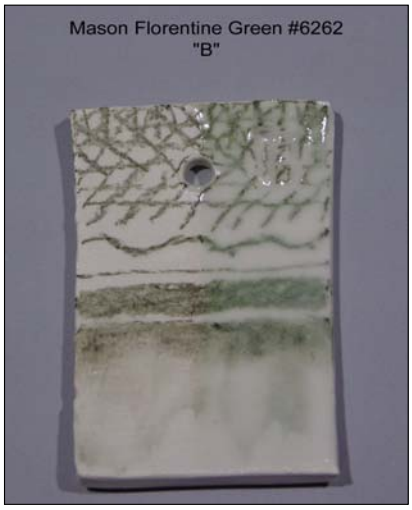

Mason Pansy Purple #6385
"B"

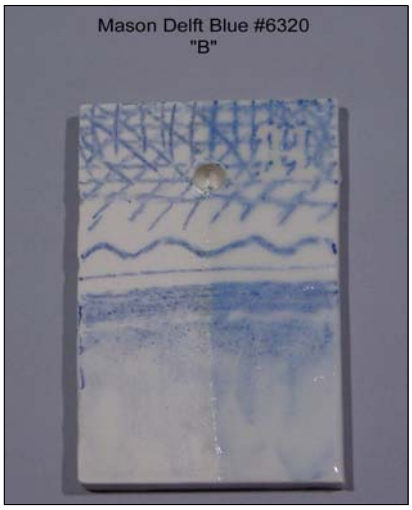

Mason Deep Crimson #6005
"B"


Mason Blackberry Wine #6381
"B"

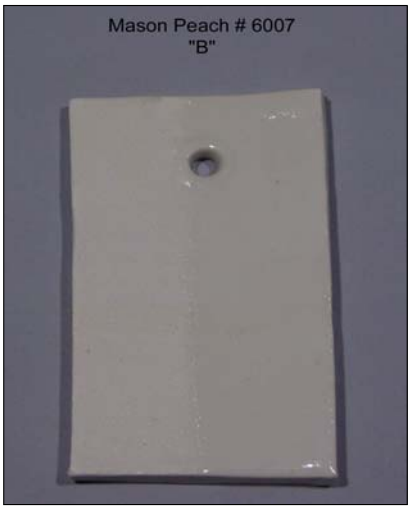

MB 8030 Crimson Pink
"B"


Cerdec Intensive Red #279496
"B"


Mason Florentine Green #6262
"B"


Mason Delft Blue #6320
"B"


Mason Chartreuse #6236
"B"


Mason Peach # 6007
"B"

Name: Jane Orr
Type: Under glaze pencils
Color: Various
Texture: n/a
Cone: 10 oxidation and reduction

Recipe:

Jackson Ball	50
Kona F-4	25
Flint	25
	100%

Add: Various amounts of commercial stains:

Mason Dark Red #6021
Mason Zirconium Vanadium Blue #6391
Mason Praseodymium Yellow #6433

Development Process: The purpose of this project was to make ceramic pencils from different stains, which could be used to draw on bisqueware.

Mixtures were extruded into 1/4 " rods using a handheld extruder.

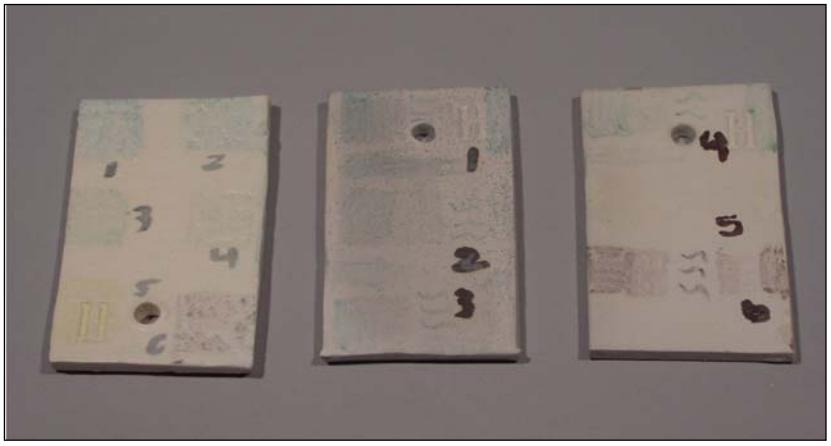
The following legend was used for the tests:

15	15% red
14	11.25% red + 3.75% yellow
13	11.25% red + 3.75% blue
12	7.5% red + 7.5% yellow
11	7.5% red + 3.75 yellow + 3.75% blue
10	7.5% red + 7.5% blue
9	3.75% red + 11.25% yellow
8	3.75% red + 7.5% yellow + 3.75% blue
7	3.75% red + 3.75% yellow + 3.75% blue
6	3.75% red + 11.25% blue
5	15% yellow
4	11.25% yellow + 3.75% blue
3	7.5% yellow + 7.5% blue
2	3.75% yellow + 11.25% blue
1	15% blue

To increase durability of the pencils, I tried adding sodium silicate in 2.5%, 5%, 7.5%, 10%, 12.5%, and 15% additions. Anything higher than .5% was to much and the pencil became way to hard to draw with. The consistency of the material after 2.5 % of sodium silcate was almost unusable. When trying to extrude the underglaze pencils they would not easily form into pencils with sodium silicate additions.

Pencils applied to bisqueware and fired to cone 10

Tile on the left had a clear glaze applied over top (underfired); For all tiles, pencils were applied over a prefired white slip, then fired to cone 10



Tile on the left had a clear glaze applied over top (underfired)

Detail from above right tile

Detail from left

Various colors

Various colors with clear glaze over top
(poorly mixed and underfired)

Name: Ashley Oliver
Type: Burnout bodies
Color: White stoneware body, various degrees of whiteness after firing
Texture: Various
Cone: 10 oxidation and reduction

Recipe:		
	Helmer	50
	EPK	25
	C&C ball	25
		100%

Add: Various amounts of organic materials

Development Process: In this experiment I looked at burnout bodies and how different materials would affect the clay once they had been fired. Each burnout ingredient was added to the same clay body in 1% increments up to 4%. There were eight tiles for each burnout ingredient (four in oxidation; four in reduction).

The ingredients were dry mixed and passed through a seive. After adding water and wedging, they were rolled into tiles, cut and labelled indicating the weight and firing type.The firing was not done by me so the details on the firing are not available.

Once fired, I observed the following results:

Pasta (very fine): Hardly any change in the clay body. There was nothing peculiar. They appeared unaffected after firing.

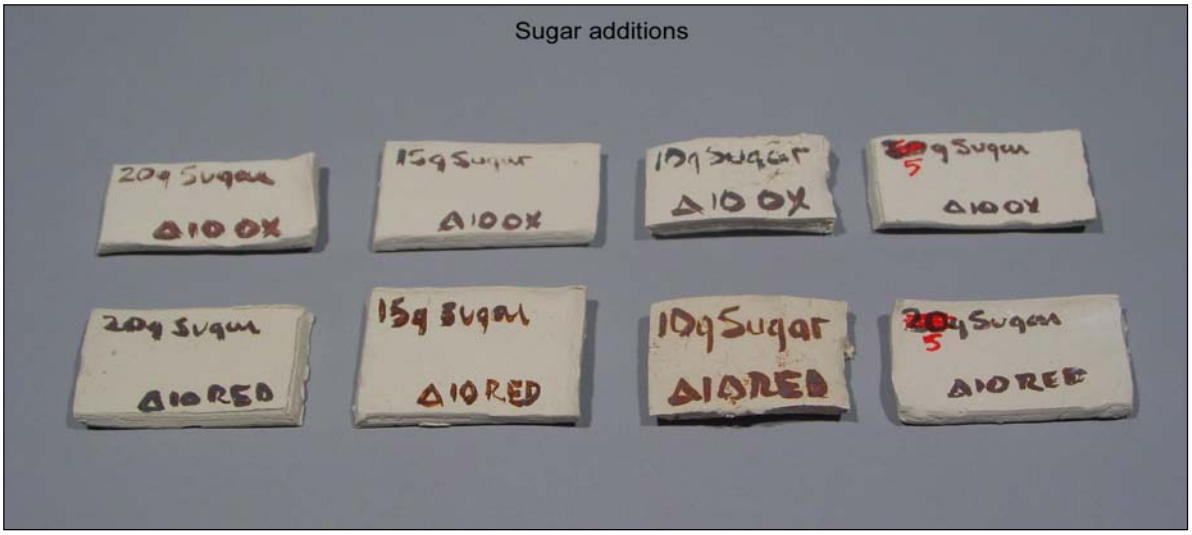
Flour: No visible change after firing.

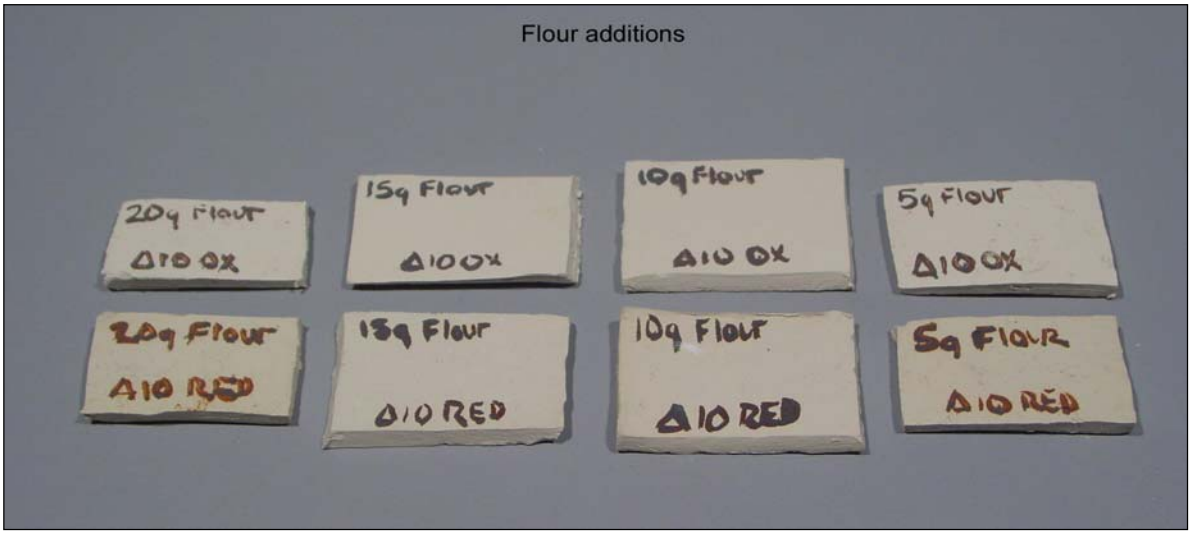
Sugar: No visible change after firing.

Rice: Very large in the fired body. The clay did not stay together. It came out of the firing in fragments and small pieces. I would not use this in a clay body for normal use. Very unreliable and worthless.

Baking Soda: The body became brown and rust colored with as additions increased. The results resembled a clay body being fired in a soda or salt kiln.

Seasoning: The body looked discolored in some places. My guess asto why this happened is because as the clay was drying out, mold developed on the wet clay which caused discoloration. This most likely carried through during the firing.


Sugar additions
20g Sugar
Δ10 OX
15g Sugar
Δ10 OX
10g Sugar
Δ10 OX
5g Sugar
Δ10 OX
20g Sugar
Δ10 RED
15g Sugar
Δ10 RED
10g Sugar
Δ10 RED
5g Sugar
Δ10 RED


Flour additions
20g Flour
Δ10 OX
15g Flour
Δ10 OX
10g Flour
Δ10 OX
5g Flour
Δ10 OX
20g Flour
Δ10 RED
15g Flour
Δ10 RED
10g Flour
Δ10 RED
5g Flour
Δ10 RED

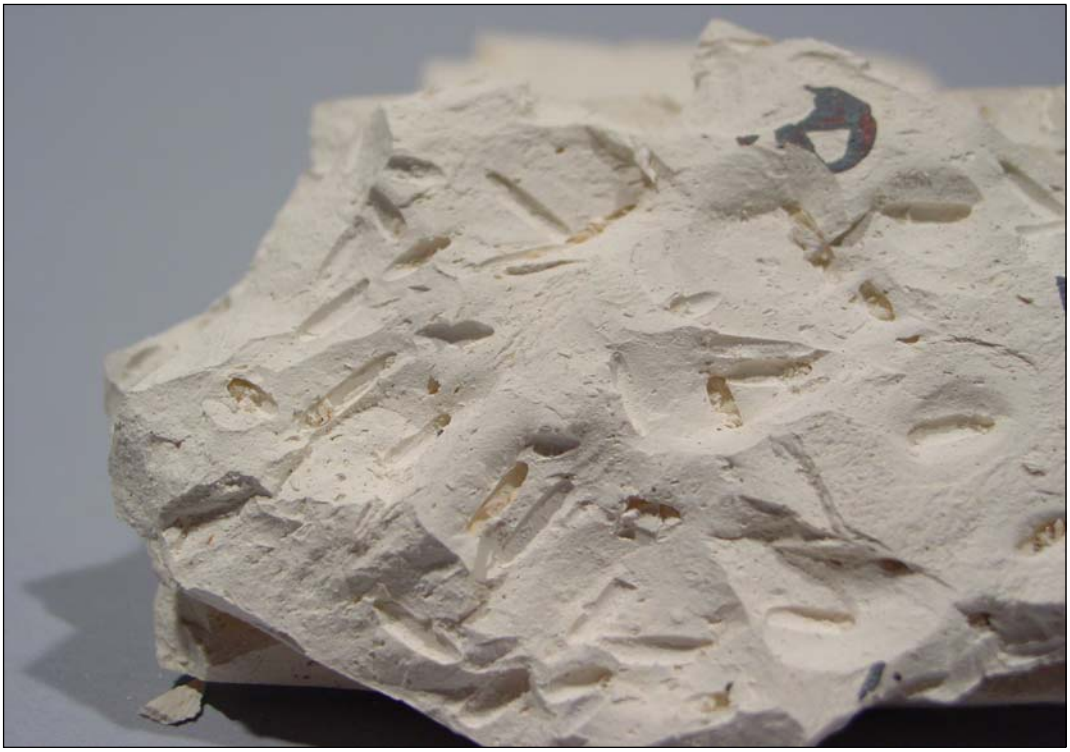

Pasta additions
20g pasta
Δ10 OX
15g Pasta
Δ10 OX
10g Pasta
Δ10 OX
5g Pasta
Δ10 OX
20g Pasta
Δ10 RED
15g Pasta
Δ10 RED
10g Pasta
Δ10 RED
5g Pasta
Δ10 RED


Seasoning additions
20g seasoning
Δ10 OX
15g Seasoning
Δ10 OX
10g seasoning
Δ10 OX
5g Seasoning
Δ10 OX
20g seasoning
Δ10 RED
15g Seasoning
Δ10 RED
10g Seasoning
Δ10 RED
5g Seasoning
Δ10 RED


Baking Soda additions
20g Soda
15g Soda
Δ10 OX
10g Soda
Δ10 OX
5g Soda
Δ10 OX
10g Soda
Δ10 RED


Rice additions
Δ10 OX

Detail of rice additions



Name: Kathleen (Kate) Deprez
Type: Porcelain
Color: White
Texture: Various
Cone: 10 Oxidation

Development Process:

Introduction

There is always a need for pure white porcelain, however most of those available today are quite expensive. So, we might rephrase and say that there is a need for inexpensive pure white porcelain: the ultimate goal being a body that can rival Southern Ice® in whiteness and still be workable enough to be used in many different forming techniques. These tests use a similar composition formation process to obtain results in a slightly new but hopefully promising direction.

Procedure

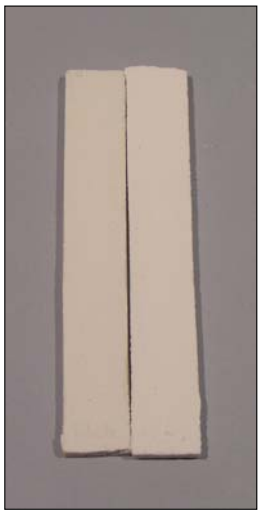
A batching calculator spreadsheet created by Matt Katz was used to calculate each of the sample batches used. It monitors % clay as well as % free quartz and % glass.
The first test conducted simply compares Tile 6 Kaolin to Super Standard Porcelain in the same weight percent in matching 1000 gram batches. The recipes are shown in table 1. The two batches were blunged for approximately 30 minutes each with 1.1L of H2O. They were then solid cast into bars and dried carefully to minimize warpage. The SSP bars were more successful and had no breakage, whereas the Tile 6 bars were improperly cast and 3 out of 5 bars broke into 2 or more pieces upon removal from the mold. The bars were fired to cone 10 in an oxidizing atmosphere.

Test 1:Tile 6 vs SSP

SSP Body	
Ingredient	Weight %
SSP	20.79
EPK	13.86
Kaopaque	20.79
G-200	25.69
Flint	18.86
Total	99.99

Tile 6 Body	
Ingredient	Weight %
Tile 6	20.79
EPK	13.86
Kaopaque	20.79
G-200	25.69
Flint	18.86
Total	99.99

Table 1. The compositions for Test 1



Tile 6 body on the left; SSP body on the right

The second test conducted used the Tile 6 recipe as a basis and then varied the % free quartz. This was done by slightly decreasing the weight% flint while increasing all other ingredients in the batch. Table 2 shows the weight%s for each sample batch.

Test 2: Quartz/Glass Levels

"+20"		"+15"		"+10"	
Ingredient	Weight %	Ingredient	Weight %	Ingredient	Weight %
Tile 6	16.92	Tile 6	17.94	Tile 6	18.94
EPK	11.28	EPK	11.96	EPK	12.62
Kaopaque	16.92	Kaopaque	17.94	Kaopaque	18.94
G-200	20.91	G-200	22.16	G-200	23.40
Flint	33.96	Flint	30.00	Flint	26.11
Total	99.99	Total	100	Total	100.01

"+5"		"0"		"-5"	
Ingredient	Weight %	Ingredient	Weight %	Ingredient	Weight %
Tile 6	19.92	Tile 6	20.90	Tile 6	21.86
EPK	13.28	EPK	13.93	EPK	14.57
Kaopaque	19.92	Kaopaque	20.90	Kaopaque	21.86
G-200	24.62	G-200	25.82	G-200	27.02
Flint	22.26	Flint	18.44	Flint	14.68
Total	100	Total	99.99	Total	99.99

"-10"		"-15"		"-20"	
Ingredient	Weight %	Ingredient	Weight %	Ingredient	Weight %
Tile 6	22.81	Tile 6	23.76	Tile 6	24.68
EPK	15.21	EPK	15.84	EPK	16.46
Kaopaque	22.81	Kaopaque	23.76	Kaopaque	24.68
G-200	28.19	G-200	29.35	G-200	30.50
Flint	10.97	Flint	7.30	Flint	3.67
Total	99.99	Total	100.01	Total	99.99

The second round of castings yielded fewer perfect bars than the castings done for Test 1. I believe this is due to having an overly saturated mold and a slip that had not been calibrated for casting. Many of the bars were delaminated when removed from the mold and some had broken into multiple pieces. Despite careful drying, even more bars continued to crack and some were lost in transporting them and loading them into the kiln. Test 2 was intended to determine slumping dependency on compositional excess glass. The 9 bodies were made and cast into bars. These bars were then dried and fired to cone 10 in an oxidizing atmosphere.

The degree of slumping was determined based on linear deformation minus standard linear shrinkage from firing and vertical deformation. Figure 1 shows the firing set up.

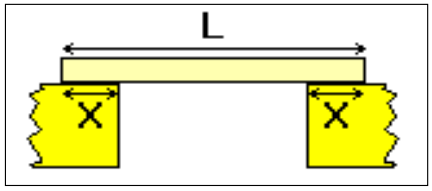


Figure 1. Firing set up where X is approximately 15% of L

Each bar was sorted into a length range and fired with an overhang corresponding to the average length of bars in the range. Time constraints, as well as lack of space in the kiln made this averaging necessary. Table 3 shows the assigned sample numbers for each bar as well as its length and the overhang that was used.

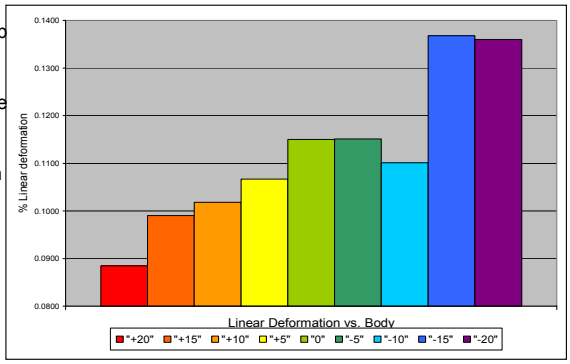
Sample #	Body ID	Length	Over-hang
1	"+20"	20	3
2	"+20"	13.3	2
3	"+20"	13	2
4	"+15"	20.2	3
5	"+10"	20	3
6	"-15"	17.4	2.5
7	"-10"	13.5	2
8	"-15"	20	3
9	"-5"	16.4	2.5
10	"0"	20	3
11	"-15"	19.8	3
12	"0"	20	3
13	"+5"	20	3
14	"-10"	11	2
15	"-5"	13.7	2
16	"+10"	14.2	2
17	"+5"	12	2
18	"-20"	12.5	2

Table 3. Sample #s and lengths for Test 2

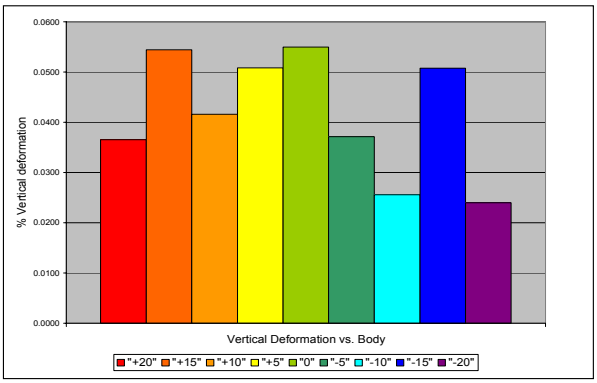
Results

Test 1 was a comparison between the SSP body and the Tile 6 kaolin body. The results showed that the Tile 6 bars fell apart more than the SSP bars and therefore could have lower green strength. Both bodies fired well, and both have comparable degrees of whiteness, although the SSP had a slightly more translucent quality to it.

Based upon the results of the slump test, there seems to be a clear correlation between glass content and linear deformation. This can be paralleled by the decrease in shrinkage as glass content is increased. Greater silica content in a body composition will decrease any shrinkage. These results can be seen in the chart above and to the right.



The beginning assumptions were that higher glass content would increase slumping. According to the test results, there is not a clear correlation, but instead an average high versus low effect. The chart to the right indicates that the bodies with an excess of free silica have much higher average vertical deformation than the bodies with a deficiency in excess silica. The high level of deformation in body "-15" can be seen as an aberration due to primitive testing methods and apparatus.



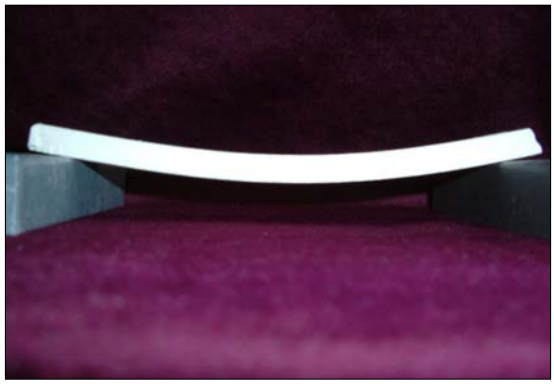


Figure 2. Post-firing sample from test 2

Summary

The results of these tests show that bright white porcelain is attainable with both SSP and Tile 6 kaolin, and that increased glass content will increase slumping behavior. In future tests, the casting should be done with a more precise method and bars should be cast until complete sets of “perfect” bars are obtained. Further slump testing should be done with a larger range of glass content levels, and in more closely controlled firing conditions. Also, a reliable method of calculating the degree of slumping should be adopted.

Name: Sean Lundgren
Type: Translucent Porcelain
Color: Blues
Texture: Smooth and a little glassy
Cone: 10

Recipe: Jeff Cole Porcelain

Grolleg	55
Kona F-4	35
Flint	15
Vee Gum	3
	100%

Add: Cobalt Oxide — Various amounts

Development Process: My Original intention was to create a porcelain that would become translucent but also as dark as possible. I originally planned on adding Mason commercial stains but soon realized how expensive that would get for large batches. I thought of using manganese but decided not to because of the dangers associated with it. Ultimately I decided to go with cobalt. It seemed like a good decision; I could get a blue with small amounts and a closer-to-black blue in larger amounts.

In order to observe the different amounts of cobalt in the clay, I mixed up seven batches with the following percentages of cobalt: .1, .25, .5, 1, 1.5, 2, 3. I mixed up each batch as a slurry in 500 gram batches. These were poured out over thick paper to dry them out. This process took a bit longer than I anticipated. Once the samples were dry enough, I wedged them up and rolled them out into slabs. The slabs were formed into curving, standiing walls. The idea was to make a thin plane that would hopefully be transparent after firing.

What emerged from the kiln was a bit disappointing. All of the samples warped or cracked quite a bit and none of them were transparent. The largest amount of color variation was in the .1 to the 1% range. Additions beyond that looked only slightly darker. It became a point of diminishing returns. I concluded that this clay would probably work better as a clay to be used in molds.


Cobalt Carbonate
.1%
.25%
.5%
1%
1.5%
2%
3%

3% Cobalt Carbonate

2% Cobalt Carbonate

1.5% Cobalt Carbonate

1% Cobalt Carbonate

.5% Cobalt Carbonate

.25% Cobalt Carbonate

.1% Cobalt Carbonate

Name: Robert Kostelnik
Type: Custom Grog
Color: Green, celadon, and white
Texture: Various
Cone: 10
Firing Notes: Glaze fired to Cone 06 to sinter then ground up
Pecularities: Plaster molds are easy to break after fired

Recipe:

Keator White	
Kona F-4	40
Whiting	10
Flint	20
EPK	10
Talc	20
	100%
Add:	
Bentonite	3

ABC Celadon	
Custer	45
Whiting	17
EPK	11
Flint	27
	100%
Add:	
Bentonite	2
Red Iron Oxide	2

Mold Green	
Nepheline Syenite	60
Strontium	20
Tennessee #10	10
Flint	9
Lithium Carbonate	1
	100%
Add:	
Bentonite	1
Titanium Dioxide	5
Copper Carbonate	5

#444 Stoneware Throwing Body	
Hawthorn Bond 35	40
Goldart	25
OM4	25
G-200	10
Sand	5
	100%

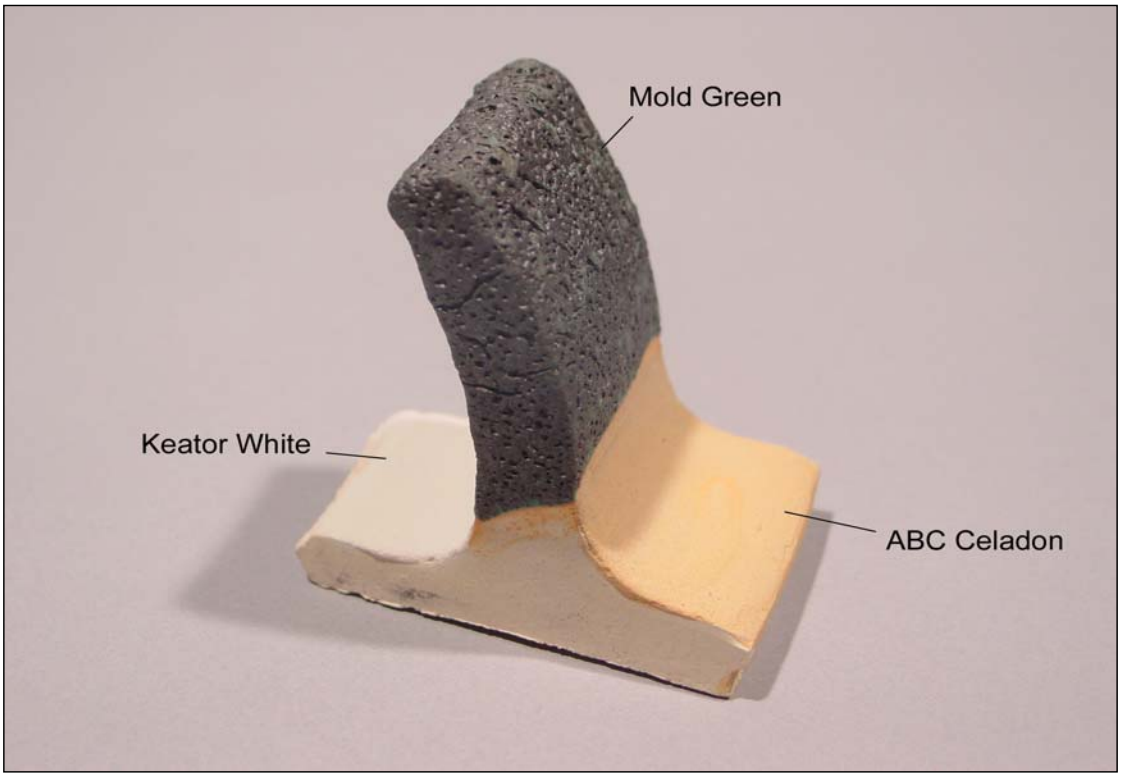
Development Process: I wanted to make aggregate using prefired glazes that could be imbedded into a clay body's surface. I was curious to see how chunks of prefired glaze would react to being fired again. This required creating a mold system that would allow the glazes to sinter and then release after firing

The plaster was mixed to a one to one to one ratio, one part plaster, one part silica, and one part water. I made plaster silica molds by suspending plastic drinking cups inside of slightly larger quart containers. After the plaster mixture was mixed in the quart container, a smaller plastic cup was pushed down into the container, displacing volume and forcing the plaster to move upwards. The space between the cup and container ended up defining the final mold. Once the mixtures set up I cut the inner cup and outer container to reveal the plaster molds.

I wet mixed the glazes and poured them out in the molds . Once the glazes were dry, the molds were embedded into sand in the kiln and fired to cone 06. After that firing I broke the glaze with a hammer and added it to the clay test tiles.

The final test tiles were fired to cone 10 and the glazes matured as expected. The mold green ran a little which is fine. The ABC celadon and the Keator White came out as solid chunks of glaze, which is closer to what I was looking for.

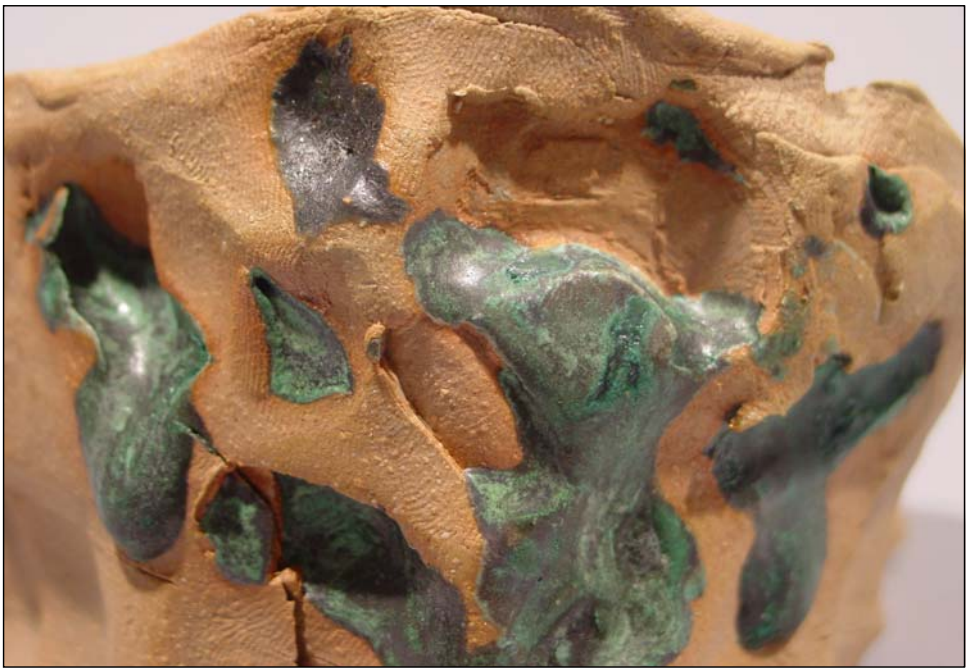
A preliminary test was done to see how dense the different glazes would be at cone 06. Mold Mold green started to vitrify, while Keator white and ABC Celadon remained quite porous .



Keator White

ABC Celadon

Mold Green



Class evaluation of claybodies...

Developed by:	Group 1
Type:	Dirty Porcelain for Flashing
Color:	Off White
Texture:	Smooth
Cone:	10 Oxidation

Recipe:		
	EPK	31.4
	Helmer	15.7
	C&C Ball	15.7
	Kona F-4	19.8
	Flint	14.9
	Molochite 200 mesh	2.5
		100%

Class Ratings

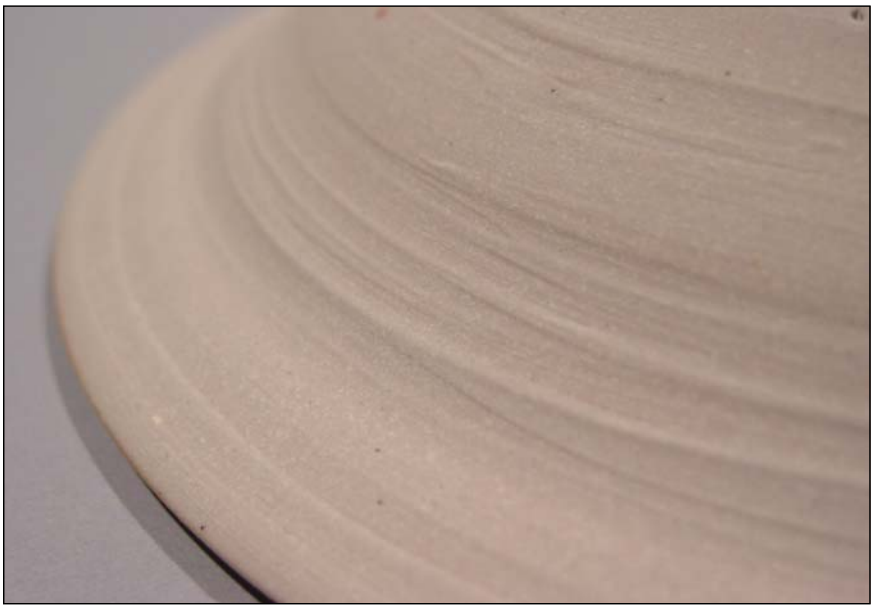
Poor	1
Average	2
Good	3
Very Good	4

Throwing
5 students surveyed

Plasticity	3.4
Building strength/Resistance to slumping	1.4

Hand Building
5 students surveyed

Plasticity	3.4
Building strength/Resistance to slumping	1.8



Developed by:	Group 2
Type:	Throwing Body
Color:	Grey
Texture:	Smooth
Cone:	10 Reduction

Recipe:		
	Goldart	39.6
	XX Saggar	19.8
	EPK	19.8
	Kona F-4	10.8
	Flint	4
	Fine Grog	6
		100%

Class Ratings

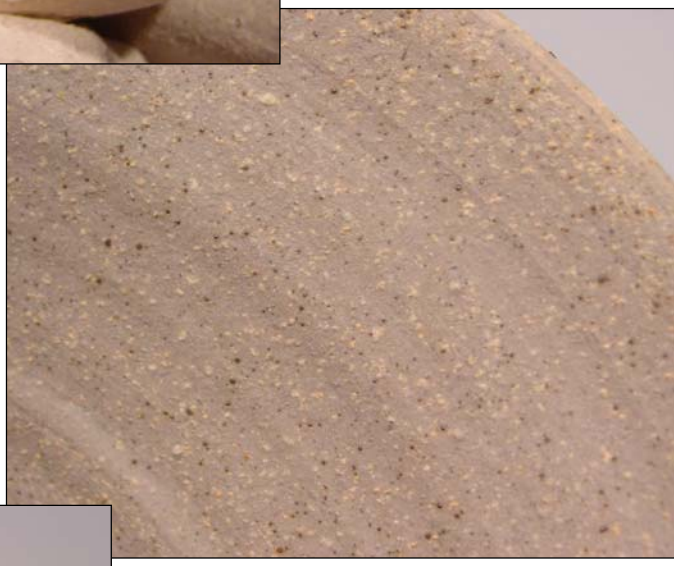
Poor	1
Average	2
Good	3
Very Good	4

Throwing
5 students surveyed

Plasticity	3
Building strength/Resistance to slumping	2.6

Hand Building
6 students surveyed

Plasticity	3
Building strength/Resistance to slumping	3



Developed by:	Group 3
Type:	Hand building
Color:	Red
Texture:	Semi Smooth
Cone:	04

Recipe:		
	Alfred Shale	59.34
	Lizella Clay	19.78
	Frit 3110	3.44
	Whiting	3.44
	Wollastonite	9
	Fine Grog	5
		100%

Class Ratings

Poor	1
Average	2
Good	3
Very Good	4

Throwing
4 students surveyed

Plasticity	3
Building strength/Resistance to slumping	2.3

Hand Building
6 students surveyed

Plasticity	2.5
Building strength/Resistance to slumping	2.8

Developed by: Group 4
Type: Throwing Body
Color: Cream
Texture:
Cone: 6 Oxidation

Recipe:

Tile 6	18.86
Hawthorn Bond	18.86
Foundry Hill Cream	37.72
Nepheline Syenite	11.04
Talc	5.52
Flint	4
Fine Grog	4
	100%

Class Ratings

Poor	1
Average	2
Good	3
Very Good	4

Throwing
5 students surveyed

Plasticity	3.2
Building strength/Resistance to slumping	2.8

Hand Building
4 students surveyed

Plasticity	3.5
Building strength/Resistance to slumping	3.5

Developed by:	Group 5
Type:	Hand building
Color:	Dark
Texture:	Rough
Cone:	10 Oxidation/Reduction

Recipe:		
	Alfred Shale	31.2
	Tennessee 10	16.6
	Hawthorne Bond 20 mesh	15.6
	KT Stone	15.6
	Fine Grog	12
	Medium Grog	9
		100%

Class Ratings

Poor	1
Average	2
Good	3
Very Good	4

Throwing
3 students surveyed

Plasticity	1
Building strength/Resistance to slumping	2

Hand Building
7 students surveyed

Plasticity	2.4
Building strength/Resistance to slumping	3

Left piece is reduction fired

Oxidation fired

Reduction fired

Developed by: Group 6
Type:
Color:
Texture:
Cone:

Recipe: Lost

in lab 3 our recipe was EPK 25, OM4 12.5, Hawthorn 35 12.5, and G-200 50. When we added the fillers we went with point 13 on the triaxial chart. We added light grog(point b) and medium grog(point C).

100%

Class Ratings

Poor	1
Average	2
Good	3
Very Good	4

Throwing
3 students surveyed

Plasticity	2.6
Building strength/Resistance to slumping	2

Hand Building
7 students surveyed

Plasticity	2.4
Building strength/Resistance to slumping	2.9

Two left pieces are reduction fired

Oxidation fired

Reduction fired